RAILROAD GAZETTE

SATURDAY, JULY 12, 1873.

Locomotive "Austria," on Engerth's System, from the Vienna Exhibition.

The accompanying illustration, which with the description is taken from *Engineering*, is a sketch of the locomotive "Austria," one of those exhibited in Vienna. The engine, which is built on what is known in Germany as Engerth's system, was built at the works of the Austrian State Railway Company in Vienna.

The locomotive, which has inside cylinders, has four coupled driving-wheels, 5 feet 2 inches in diameter, placed 8 feet 7¾ inches apart from center to center. The tender, or tank, and the rear end of the engine are carried on three pair of wheels, 3 feet 1¼ inches diameter, these wheels having a total wheel base of 11 feet 4½ inches. The tender-frames extend past the sides of the firebox, and are connected by cross stays to a coupling pin under the barrel of the boiler, between the firebox and the main driving-axle, this arrangement, by which the weight of the fire-box is carried by the tender-frame, being the distinctive feature of Herr Engerth's system. The total wheel base is 27 feet 3½ inches.

The cylinders are 16⅝ inches diameter and 22 13/16 inches stroke. The guide bars, of which there is a pair for each cylinder situated above the center line of the cylinder, are round, and are embraced by glands carried by the crosshead. The arrangement would hardly meet the approval of American builders of the present day. The steam-pipes are carried down outside the smoke-box. The link motion is the ordinary shifting link, and the engine is provided with screw reversing gear. The axle-box guides for the coupled wheels are fitted with adjustable wedges.

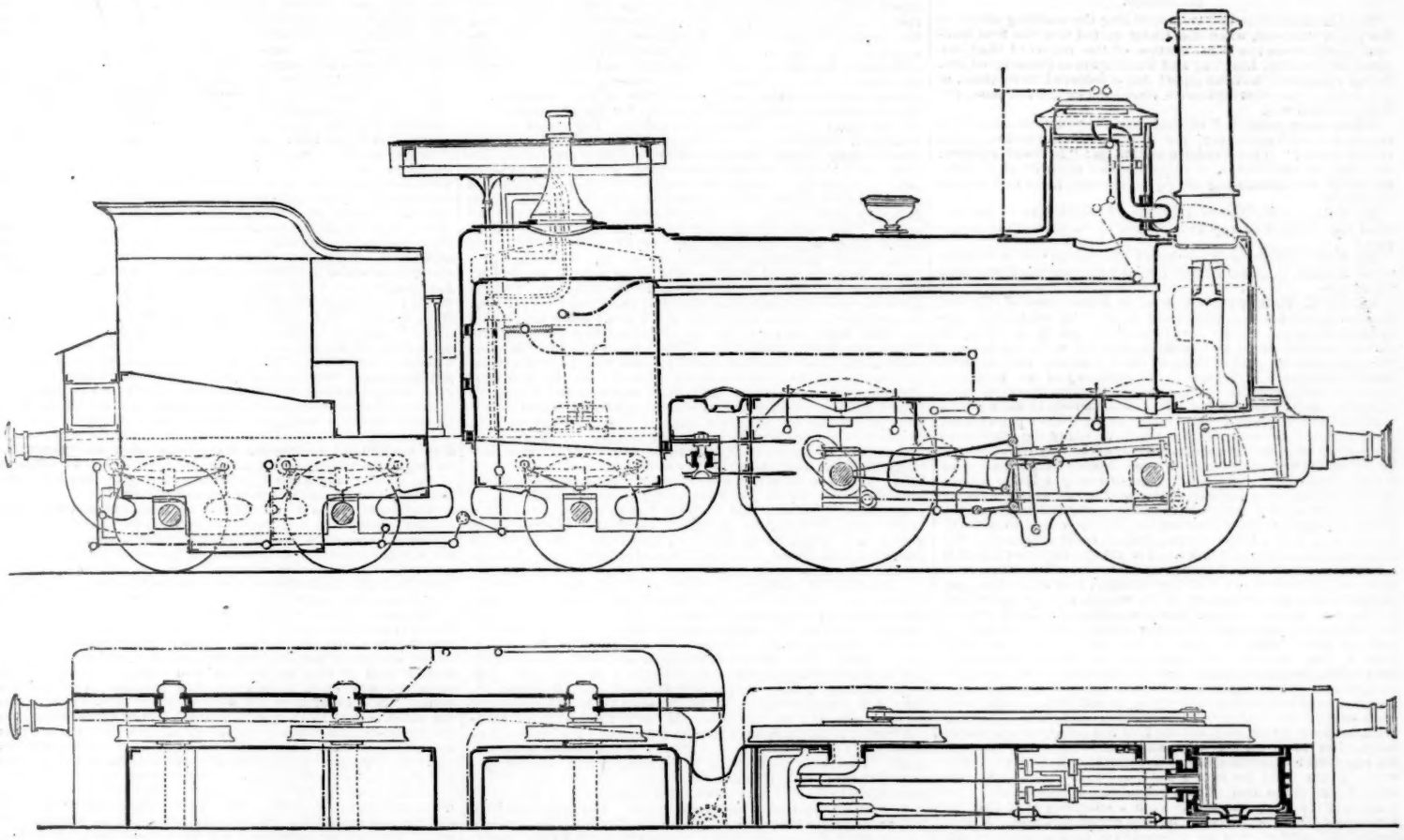
The barrel of the boiler is 4 feet 3½ inches in diameter inside the largest ring, and 13 feet 10½ inches long between tube plates. The plates used for the barrel are 7-16 inch thick. At the works of the State Railway Company all boiler plates are bent hot, and all the rivet holes except those in flanged plates, are punched. The riveting is done by hand, the longitudinal seams, and in some cases the transverse seams also, being doubly riveted. The engine in question, like all Austrian engines, has a pretty large dome, and it will be noticed that the barrel is strengthened at the opening by the plates being flanged inward, a plan adopted in all the engines built at these works. The dome cover is of wrought iron stamped in a hydraulic forging press. The mud drum, under the boiler, is also stamped in a hydraulic press, and is flanged inward at the bottom, so as to form a kind of lip for holding the india rubber packing used in making the joint.

The boiler has 179 tubes, 2 1-16 inch outside diameter. The heating surface of the fire-box is 87 square feet and of the tubes 1,345 square feet, giving a total heating surface of 1,432 square feet. The grate area is 18.8 square feet, and the engine is intended to be worked at an effective pressure of nine atmospheres, or 132.3 pounds per square inch.

An ordinary screw brake is fitted on the two hind pairs of wheels, and the engine is fitted with Chatelier's counter pressure arrangement. The engine frames, as will be seen from the plan, terminate in front of the firebox and are there held together by cross-stays, which carry the center-plate into which fits the coupling, or rather center-pin, carried by the tender frame. The frames, both of engine and tender, are plate frames, the engine frames being inside and the tender frames outside. A large part of the tank is below the floor, as will be seen from the engraving.

The length of the engine over all is 38 feet 5½ inches, its greatest width 9 feet 7½ inches, and its height 15 feet 2½ inches. The weight empty is 36.25 tons and in working order 50.6 tons. Of this latter weight the forward drivers carry 10.9 tons, the main drivers, 13.15 tons, the first pair of tender wheels 9 tons, the second pair 8.8 tons, and the rear pair 8.75 tons. The four driving wheels thus carry 24.05 tons, or less than half the whole weight.

Locomotives on the Engerth system have been in use on the Austrian State Railways since 1856.



LOCOMOTIVE "AUSTRIA," ON ENGERTH'S SYSTEM, FROM THE VIENNA EXHIBITION.

The Master Car-Builders on Heating, Ventilating and Lighting Cars.

At the recent convention of the Master Car-Builders' Association in Boston, the Chair called for the report of the Committee on Heating, Ventilating and Lighting Passenger Cars, whereupon the report was presented and read by Mr. V. D. Perry, as follows:

REPORT.

To the Master Car-Builders' Association:

GENTLEMEN: The committee appointed at the meeting of your Association in St. Louis, on the 12th and 13th of June, 1872, to investigate the different methods of lighting, heating and ventilating railway passenger cars, beg leave to report as follows:

The following interrogatories were embodied in a circular sent by the Secretary of the Association to all the master car-builders in the United States, namely:

"1st. How many cubic feet of fresh air do you think should be supplied to each passenger per minute, in order to keep the air in a car pure? 2d. In your opinion, what are the best means for admitting this quantity of air into, and what for exhausting an equal quantity from, cars in cold weather? 3d. Have you heating and ventilation combined? If so, how is it accomplished and what are the results? 4th. What kind of stoves and fuel do you recommend for heating cars? 5th. What in your opinion are the best means for protecting cars from damage by fire in case of accident to the train? 6th. How are the cars on your road lighted—with gas, candles or oil? If the latter, what kind of oil? 7th. Please state how the cars on your road are ventilated and warmed, and the number which use the various plans, with the general results; and give any other information relating to these subjects which you may consider valuable to the committee."

After waiting some time, answers began to come in slowly, as follows: With respect to ventilation, one road used Cowell's exhaust ventilator on dome; 7 used Creamer's, 4 used Howard's, and 2 used exhaust ventilators in side of dome, receiving the air from under the end projection. One road uses exhaust ventilators of all descriptions in dome, and ventilators above the windows in the end of the car.

Your committee, after trying some experiments with the different kinds of ventilators—using powder for the trial—found that 1½ oz. of powder, exploded in any of the 76-seat passenger-cars, with only exhaust ventilators in the dome, would require 20 or 30 minutes to clear the car, on an accommodation train running against the wind at the rate of 21 miles per hour; while the same car with ventilators used over the end windows, and exhaust ventilators in the dome, required only from 8 to 10 minutes. Your committee are not able to give the exact amount of air forced into the end of the car, either through the opening over the windows, or through that in the end of the dome. Authorities do not agree as to the amount of fresh air required for each passenger per minute. It depends a good deal upon the cleanliness of the passengers. The estimates vary from 4 to 10 cubic feet per minute.

A 76-seat car, or a car 53 feet long, 9 feet high, and 8 feet 6 inches wide, contains about 4,054 cubic feet of space. A train of 13 cars, containing 4,054 cubic feet each, will contain in the aggregate 52,702 cubic feet. Allowing 76 passengers in each car, will give a total of 988 passengers. The quantity of air required for each person in a building, as estimated by the various authorities, is from 4 to 6 cubic feet per minute. We suppose 4 would be ample for winter, and 10 for summer. Four cubic feet per minute for 988 passengers, gives a total of 3,952 cubic feet, or 237,120 per hour, which involves an entire change of the air in 13 cars in about every 15 minutes.

To accomplish this combined result of heating and ventilating passenger cars, whereby passengers can be supplied with about 10 cubic feet of fresh air in summer, and from 4 to 10 cubic feet of fresh heated air in winter, Mr. Gordon, of Boston, has proposed the following method: He would place in a baggage car, or in a car provided for the purpose, a fan and a small engine for summer purposes, and a large hot-air furnace, in combination with the fan and engine, in winter. These are to be connected with perforated pipes running through each car, the impure air to be exhausted through the bottom of the car. Your committee are aware that there is an objection to this plan, as the cars cannot be heated or ventilated until the whole train is made up and ready for the road.

Another plan has been proposed by Sanborn & Gates, of Boston. Their plan is to heat passenger cars by steam, the same as applied to buildings; placing a small boiler in the baggage car, and conveying the steam through pipes which are to be connected with each car. For ventilating, they propose the use of a double-acting, reversible fan-blower, which is placed under the car, and is actuated by a belt from an axle of one of the trucks. The blower is supplied from an air chamber at the side of the car, the air having previously passed through large screens to remove its mechanical impurities; thence it is driven through a single tube to the top or monitor part of the car, and is distributed to every part alike. The distributing tube which extends around the top, is perforated with a very large number of small orifices, through which the air is admitted into the car in modified obliquely downward currents. By this means the original currents are so broken up and diffused as to be imperceptible to passengers, and the whole body of air in a car has a gentle downward motion. The provision for removing the air after it shall have accomplished its object, is by means of registers along the central aisle, which communicate under the floor with the outer air. The blower being capable of furnishing the maximum quantity of air when the car moves at its average rate of speed, the supply is easily adjustable by a cut-off in the connecting-pipe in its passage through the air-chamber, where it is out of the reach of the passengers. The exit registers are also adjustable, and may be closed altogether when desired. Whether the adjustment is for a large or small quantity, the supply is found to be quite uniform and regular while the car is in motion. The same objection will be found with the practical working of this plan as with Mr. Gordon's.

Your committee have received communications from twenty-seven different roads in answer to the question as to the best method of heating cars. Ten of these roads use coal-stoves, twelve use wood-stoves, and five use Baker heaters. None of them combine heating and ventilation.

Your committee do not see how they can improve the present mode of heating passenger cars, unless by putting ventilators in the car, connected with the stove by a pipe, so as to warm the air the same as by a hot-air furnace before diffusing it through the car. Your committee believe that a more perfect system of heating and ventilating passenger cars, both in summer and winter, can be devised by the adoption of plans similar to those before spoken of.

Your committee have not received any answers to the questions asked in No. 5 of the circular, which suggest any practical

method for protecting cars from damage by fire in case of accident; but would recommend that each train be provided with fire-extinguishers, axes and pails, with increased protection for stoves.

On the question of lighting cars, your committee have received communications from 27 roads as follows: 10 use candles, 14 use mineral sperm oil, two use kerosene, and one sperm oil. Your committee would recommend the use of mineral sperm oil, or any other oil that will give as good a light as kerosene, and stand a fire test of not less than 300. We have tried several experiments with mineral sperm and other oils. The first experiment was to set fire to a barrel of shavings, and extinguish it by turning on mineral sperm oil. The next was to saturate three pine boards, 12 inches square each, the first with lard oil, the second with kerosene, and the third with mineral sperm oil. We then took red-hot cinders of equal size and put in the center of each board, with the following result: The boards saturated with lard and mineral sperm oil only burned a little more than the size of the hot coal, while the one saturated with kerosene spread and charred almost the whole surface.

From the few experiments we have tried, we would recommend the use of mineral sperm oil, it being as safe as either lard or sperm oil, and at the same time giving full as good a light as kerosene.

Respectfully submitted,

V. D. PERRY,
Hartford, Providence & Fishkill Railroad,
W. E. CHAMBERLAIN,
Boston & Albany Railroad,
A. GLEASON,
Old Colony & Newport Railroad,
Committee.

DISCUSSION.

The discussion was had on assembling the morning after the the paper was read, when the Chair stated that the first business in order was the consideration of the report of the Committee on Heating, Lighting and Ventilation of Passenger-Cars. It was suggested that the report be considered in sections, in the order of the interrogatories contained in the circulars, the first of which was,

"How many cubic feet of fresh air do you think should be supplied to each passenger, per minute, in order to keep air in the car pure?" The second question is: "In your opinion, what are the best means of admitting the quantity of air into, and what for exhausting an equal amount from cars in cold weather?"

Mr. F. D. ADAMS, Boston & Albany—I would like to inquire what the Committee report in regard to the second interrogatory?

Mr. V. D. PERRY read a portion of the report; after which a pause ensued, no one seeming inclined to open the discussion, whereupon

Mr. M. N. FORNEY said—I was in hopes some of the car-builders present would take up the subject of ventilation, because it seems to me so very important that it is worthy of careful consideration; but as there does not seem to be any willingness on the part of those present, I should like to say a few words myself in regard to the quantity of air required. I find, in my intercourse with persons who have charge of cars, that there seems to be a good deal of vagueness in their minds in regard to the quantity of air which is needed for passengers. And, in fact, if any one will undertake to study the subject of ventilation from the books which have been written about it, he will find there is almost an equal degree of vagueness in them in reference to that point. One of the best books I know on the subject, or rather one of the best books which indicate the quantity of air required is "Huxley's Physiology," which I would recommend every member to read who cares to investigate this subject. It has a great deal of other information besides what relates to fresh air. Its article on this subject is better than can be found in any other book. The committee have said in their report that they thought four cubic feet per air per minute per passenger in the winter, and ten cubic feet per minute in the summer, would be sufficient. Now, while I have no doubt the committee have investigated this subject with a great deal of care, I am not prepared to agree that a less amount of fresh air is required in winter than is required in summer. Air in winter will be vitiated just as soon as it will in summer, and the thing is to keep the air as pure as possible in winter as well as in summer. In the little book which I have referred to, the author says one of the most delicate tests which can be used of the purity of air is that nature has provided us with, and that is our organ of smell. We can detect impurities from odor quicker than in any other way. From what he says I have deduced that about from seven to ten cubic feet of air per minute is required for each passenger to keep the air in such a state of purity that the foulness cannot be detected by the organ of smell. A good deal of difficulty attends the admission of that quantity of air, especially in cold weather. In the first place, with from fifty to sixty passengers, it does not matter at what point the cold air is introduced, it will be felt by some of the passengers. The whole human race are in apprehension of taking cold, and just as soon as any draught is felt by any passenger, just at that moment they will attempt to shut the orifice through which it enters. The question comes back, Cannot the air be admitted in such a way as not to be a discomfort to the passengers? It seems absolutely necessary that the current of cold air should be warmed before it enters the car. How can this be done with the least difficulty? There have been a great variety of plans proposed. There are systems of heating by warm air—air passed round the stove and heated sufficiently to give the requisite warmth to those in the car; also those by which air is admitted near the stove, so that the current, in passing into the car, will pass over the stove and become mingled with the hot air which is rising all around the stove, as is always the case in any apartment. I do not propose to give any decision in reference to which plan is the most desirable. The only thing I want to impress upon this audience is the extreme importance of admitting a sufficient quantity of air to keep it pure at all times. One of the most prolific causes of discomfort in traveling in sleeping-cars, and all kinds of cars, is the foulness of the atmosphere, in cold weather especially. In summer, the natural instinct of the people to open the windows and admit fresh and cool air is so great that there is not so much difficulty from that foulness which arises from a second breathing of air. There is not so much difficulty from that in summer as in winter, when the instinct of everybody is to shut every orifice through which the cold air enters. So it seems there is more difficulty attending the ventilation of cars in winter than in summer. If the car-builders can only once realize that it is absolutely necessary that a quantity, at least not less than five cubic feet of air per minute, must be admitted, we will begin to have some great improvement in the methods of ventilation. There have, of course, been a great variety of plans proposed, and, what is very curious, in nearly all the systems thus far adopted and proposed and patented, you will find there is abundant provision for exhausting air, but no provision for admitting it. I have had a good many people say to me, if I talk about the proper means of admitting air, "It will leak in through the crevices, and come in through the windows and doors." Suppose you admit that; you come to the conclusion that the better the workmanship of the car is, the worse is the ventilation; so we must build poor cars, to have them well ventilated! It seems to me a more scientific method of getting at this would be for men, when they build cars, to provide means for admitting the air—to see that there are abundant means for its admission in such a manner as not to be a discomfort to the passengers. I hope gentlemen will discuss this subject, because the public are very much interested in it, and discuss it so thoroughly that we shall have some improvement in this matter of ventilation.

Mr. F. D. ADAMS, Boston & Albany—I confess my ignorance in regard to this matter of ventilation at once. It is a matter that, when I received the circular from the committee, I looked at with fear. I did not know what to say or what questions to attempt to answer, or what answers to make to those they had given; but I think Mr. Forney has made the subject appear to us to be one worthy of attention, at any rate. It has been thrust upon us in all manner of ways by various writers, and sometimes we have become almost disgusted with it. There have been many suggestions made next to impossible to carry out; and it used to occur to me in reading them, that if these men knew more about building cars, they would talk less about their ventilation, and how easy it was. There are one or two things I would like to have our scientific mechanics explain to us how we are going to get over. One of them is this: To get at it in the most direct manner, we will say there is no difficulty in ventilating a house. Almost everybody can get up some kind of ventilation for a house that is still and quiet, and we can make some calculation for the currents of air; we have no extra currents of air to contend with; we have got no vast amount of cinders, and smoke, and dust, which attend a railroad train. Now, just as quick as we begin to make orifices to admit air, we are going to get in a torrent of smoke, cinders and dust, and if we make an orifice to admit in a car five cubic feet per minute a passenger, at a speed of 20 miles an hour—which some of our trains may run—and if we put that train up to 40 or 45 miles an hour, it must admit a vast deal more air; and my trouble is how we are going to adjust this matter to meet all these conditions with economy. I confess I do not know. I have thought of it a good deal. I confess to the importance of ventilation. I was quite pleased with the idea of Mr. Forney, that if we are going to depend upon the orifices, or rather upon the cracks and open joints to admit fresh air, of course we encourage poor cars, which we all want to avoid. Our aim and ambition is now to increase the durability and fine workmanship of our cars. We try to emulate each other a little in building the best cars, perhaps, and I think this is very creditable. I think there was some ground, however, for the statement that the air would come in through the cracks. Years ago we had to depend largely upon outsiders to build our cars, and they used to make cracks enough in them, and they came in for repairs quick enough after they were built, and plenty of fresh air came in under the doors and through the windows and cracked panels, and various other places that might be named. That difficulty now seems to be obviated, and another one arises. We lack fresh air; there is no doubt about that. Now what I would like to have Mr. Forney or some other gentleman explain to us is, what he proposes. Give us some idea, lay out some plan for us, and we will try it and carry it out if we can. We have tried various plans on our road, and the report of the committee referred in one case to those experiments. I don't know that it was the fact, but I rather drew the inference that those experiments were tried on our road. The fact seemed to be demonstrated that those cars that were provided with the end-wickets spoken of, that took in the fresh air under the hood or projection, cleared the air of impurities in a very short space of time: whereas those that had not, were a considerably longer time in getting the impurity out. If that is a good way, of course I do not see any objection to adopting it. There is no patent on it, and no objection on that score. Mr. Forney suggests the idea that we make an orifice that cannot be closed. There seems to be a difficulty in that. When the weather is extremely cold, we do not want so much air; it makes us uncomfortable. I admit that we need just as much pure air; in other words it would be as unsafe to breathe impure air in winter as it would be in summer; but if we make an orifice that cannot be closed, there is no way of adjusting it. Perhaps it would be better to have it so you could not close it, because the generality of people that ride on railroads have a horror of currents of cold air; they had rather take upon their lungs something that will produce a fever than to feel a chill. Almost everybody will risk it rather than feel chilly; consequently, if we put a blind in there with stationary slats, it would remain so, and we should have to take at whatever speed we were running just as much air as was forced in, whereas if we were running at moderate speed, there might be just about enough forced in. We put in a wicket with an adjustable sash to close that opening partly or wholly if we choose to. We do not intend to run without having it partly open, although sometimes the passengers close it. We have adopted the plan of either cutting in the glass, "This is for ventilation," or painting it on, in the last ten or twelve cars we have built, which calls the attention of the passengers to the fact that it is for ventilation, and it they have any need for ventilation they let it alone. But passengers are just as notional as car-builders are in this matter. The blame is thrown upon the car-builders. We may produce all the facilities for ventilation there are in the world; if passengers will not use them, we cannot get the cars ventilated. And there is no other way, as I see, than to make a positive fixed opening that they cannot close, so that they have got to take in the air whether they will or no. I would like to hear from other gentlemen in regard to this subject. I suppose most of us have not read these works on ventilation. The subject has not been presented, until within a few years past, to our mind; and we are not situated so that we can have access to libraries where we can get works upon this question. Then, again, our attention has been taken up with other matters. I am ready to admit at once that I have not given the attention to ventilation this year, knowing it was to be brought up for discussion, that I ought to have done, because I have been on another committee which took up all the time I had to spare.

Mr. A. STEINBACH, Philadelphia & Reading—I do not know as I shall have anything to say on the subject of ventilation exclusively. I was well pleased with the report of the committee, presented yesterday, particularly as it has classified the different points. I had intended to say a few words on one point of the report when that section, especially, would come up; and that is the manner of heating, and preventing the car from taking fire in the case of accident. I thought when that came up I might say a word or two. I was well pleased with the remarks of Mr. Forney on that question, and I, for one, acknowledge, as my friend Adams has done, that I am ignorant of the scientific manner of ventilation, or the quantity and proper mode to suit all purposes. But what I wanted to say, particularly, is this: we have, on our road, a method of heating and ventilation different, I think, from nearly all the other roads. We have our furnaces underneath our cars; we have no fire inside the cars. This answers for ventilation during winter and summer—at all times; it can be regulated to any extent you wish. The air is distributed into our car right above the floor—right under the seats—and there is a register under each seat. The heated air, in winter, is brought in there and circulated in the car. We have no fire in the car, but have it outside. We have two furnaces suspended on rods underneath the car. In that way we bring in air sufficient, we think, for ventilation in winter, and for heating also. We have had that in use for five or six years, and we have found no difficulty in doing it, and very little complaint in regard to ventilation, although our road is a short one. We have no through-lines or sleeping-cars on our road. We are simply a short road, and run only local trains; but we run a good many of them, and I suppose we carry about as many passengers as any other road in the country, only a short distance; and we have had no difficulty with ventilation on our road. I am not prepared to say what quantity of fresh air a passenger ought or ought not to have in winter or summer; but I would say that the manner in which we bring the air into our cars is through the bottom. The air goes into the heater, and then into the cars. It is a matter of great importance; and I should like to hear the general experience of members on this point. The committee performed a great deal of labor, and have brought in an excellent report.

The CHAIRMAN—I would inquire if they have any special arrangement for preventing fire in case of accident?

Mr. STEINBACH—This furnace is cased in. We had an accident where a car ran off the track and over a bank, and there was no fire. Our furnaces are constructed in such a way, in double cases, that it is impossible for any fire to get out of them.

Mr. W. R. DAVENPORT, Erie Car-Works—This matter of ventilation is not so very difficult. The quantity of air required in a car is not so very great as we at first glance consider it to be. It is said we should give five cubic feet per passenger per minute. Now, taking the average number of passengers in a car at 40—I think that 40 will be about a fair average for each car—five cubic feet is only 200 cubic feet a minute for the whole 40 passengers. Now, certainly there is no difficulty in getting this quantity of air into a car per minute—not the least in the world. I figured it out to see. If we had a foot opening and were running at 20 miles an hour, we would put into that car 105,600 cubic feet in an hour, and nobody wants any such quantity as that. If we make a six-inch clear opening, and we receive air from the outside, supposing the atmosphere to be still and the train to be making 20 miles an hour, we will give each passenger a double dose, and more too. We will put into that car through a six-inch square clear opening 440 cubic feet a minute, which is more than double the amount required. We will say, then, that a six-inch circular, clear opening—an opening of six inches in diameter—will give us, if we put the air at 40 miles an hour, just about the quantity that we require. The passengers do not object to warm air coming in. What they object to is cold air. Warm, pure air never made anybody take cold or gave them any fever. Of course, air can be warmed and sent into a car just as pure as though it was cold. This matter is not impracticable at all, for we can take care of six inches diameter. Our friend Adams will take care of that without any difficulty. The point is to pass that air over a warm surface so that it will come into the car at a temperature not below 65°. We do not want it 90° or 100°. If we can put it into the car at a temperature of 65° it will be all right. The animal warmth produced by the presence of 40 passengers in a car raises the temperature constantly, and if you send it in at 65° it will be 70° before it is got out again, even with our best ejector arrangements. I take a great deal of interest in this matter, because it is a matter that everybody who gets into a car experiences the necessity of. We have some very excellent warming appliances now. We warm the feet of our passengers, and thus warm their whole bodies easily and nicely; but every one who has passed into a car warmed with some excellent appliances which I could name has detected by the sense of smell the impurity of the air. The air in the car is all right, but the arrangements for getting in pure air and getting out impure air are lost sight of or left to chance. The only question is to provide for receiving six cylindrical inches of pure air into a car—what we can get in going at twenty miles an hour. That would be a moderate rate of speed, and of course if we were above that the only risk is the air coming in a little colder, and that can be regulated by a gauge over the opening, which will decrease the opening it we are running at a high rate of speed or against a high wind. The brakeman can receive his orders from the conductor to regulate the opening so as to receive a less amount of air, thus leaving a less surface for receiving the air, although we will get the same quantity because it comes in at a greater rate of speed. This will provide for warming the air sufficiently so the passengers will not have any disposition to close the opening. I want to say one word in favor of the passengers, for certainly they do not object to pure air. They object to currents of cold air which shall give themselves or friends neuralgias and colds of every stripe and complexion. They had rather take the chances of breathing impure air than have a fit of sickness. It is not impracticable by any manner of means. There is another matter that friend Adams is very right about, and that is the matter of getting into a car, in summer, a sufficient amount of pure air free from cinders and dust. It is a matter that if this convention can provide for to-day, the members will each be entitled to a gold medal weighing a pound. It is a matter of the utmost importance. It is a matter which is next to an impossibility to do by any practical arrangement with our heavy palace cars. We have got to make our arrangements on top as far removed from the track as we can. We have got to get that air into the car free from dust and cinders, and got to do it in such a way as not to impede the draught of the car by the engine. That is a matter which we must take into account. We must consider our employers, and keep in mind that they will not uphold us in experiments which involve arrangements for ventilation so bulky and so complicated as to interfere with the draught of the car. If we can devise any plan by which we can get an amount of fresh air into the car that will satisfy the passengers without disgusting our employers, we will merit a great deal at the hands of the public. I see no difficulty in providing for winter ventilation; but when it comes to summer ventilation, I allow it is beyond my depth.

Mr. ADAMS, of the Boston & Albany—I would like to say another word in relation to this. I did not think I should say anything at first, but Mr. Davenport has opened my eyes a little to one thing that I think we should take a great deal of credit for. If it is a fact, as he says, which I cannot see any reason to doubt, that six inches will admit a sufficient amount of air, and change the air every minute for forty passengers, it must be conceded at once that our cars are pretty well ventilated. I don't think any one can charge the Boston & Albany Railroad with not having well-ventilated cars. If it is true that we are producing that number of cubic feet, at the rate of twenty miles an hour, we are certainly getting a good deal more than is necessary. We have got air openings in each end immediately over the windows in almost all the cars now on the road. There may be a few exceptions among some of the very old cars, but we have cut out a large quantity of the old ones, and orders were given when this method was introduced to bring all the cars into that arrangement as quickly as possible. We have an opening over each window, about 21 inches by 6, which makes something over two square feet of opening. It is not covered, either, with wire netting, to obstruct the wind or air. There is nothing but a clear hole, so the air will come in. The sparks do not come there at all. There are no cinders, no smoke and no dust; but the air comes in. There is no question about that. But I do not think it comes in with that force that it would if it was not protected at the end of the car by what we term a "hood" which gives a direction to the smoke and cinders—an inclination downward, leaving the space above that clear. So I think it must be readily admitted that we get an abundance of pure air according to that theory. But I admit it comes in, in the winter time, cold—cold enough so we want to shut them up, and they are shut up, and kept shut up in front, but not in the rear; so we are exhausting the air, and it draws upon the volume of air in the car. In the winter, it can be shut up close, or opened at any angle. Of course, if it is wholly open it makes an aperture of a little over two feet. If that is closed up within an inch, or an inch and a half, and the rear ones all open, we get a very comfortable condition of the air in the car. I meet with that difficulty in the winter that has been spoken of here; passengers get up and go and shut them. The current of air, when it comes into the car from the position of the

wicket window, is carried immediately to the dome. It goes up to the ceiling of the car, and passes along the headlining, and comes down with more or less volume at different points. About the third or fourth seat from that window, a person will feel a considerable current coming down. If we could obviate that difficulty in some way—if we could manage to distribute that air equally in the car with some very objectionable features, we should be glad to do it. But so far as bringing the air into car is concerned, I have never seen anything yet which is so good, unless Mr. Garey's plan may be better. I do not think there is much difference. I do not think he gets as much air as we do; still, there is not so much objection from the current in his as in our plan. It was thought at first we should be under the necessity of putting a wire screen over it; but we found there was no necessity for it, and we have settled down upon that ventilation, so far as we now know, as being as good a plan as we could adopt. In regard to the matter of warm air, I do not know of any better plan than Mr. Spear's operation of bringing it in around the stove. I do not know as that brings in a sufficient quantity—perhaps not. I have never seen anything yet that I was fully satisfied with as to carrying a sufficient quantity of air into a car, and warming the car up to the right temperature. Mr. Davenport alluded to the fact that passengers did not object to the air so much as they did to its being cold. Now, I have noticed one thing in my own experience, that when persons sit in a room any length of time, they become more or less insensible to the change of air, so far as it becomes impure. The organ of smell is not as keen, consequently they do not observe the impurities as much as a man does that comes directly from out-doors into the car. They do not notice the fact that the air is impure, and, consequently, will close the ventilators. I do not know of any way of preventing their being closed, more or less, by sensitive persons. They will request the conductor or some one else, to shut it, and, consequently, it gets closed up. One word more in regard to this plan of ventilation. After it was introduced on the first car, and pretty thoroughly tried on the various trains, by various conductors, and under the eye of the Superintendent, an order was given to make it a standard fixture on our road. One conductor has been on our road twenty-nine years, and is the only one who objects to ventilation. I went into the car to see these wickets; I had not seen them since putting them in. He said, "What do you put those things in for—to make holes in the end of the car? You had better stop them up right off. I never want a hole in the end of a car on any account. I would stop up all the windows." Said I, "Would you stop up the doors?" "Yes, if they could get in anywhere else." He did not want them in, yet every other conductor likes the plan, and more or less of them take considerable pains to keep them adjusted. One other item Mr. Davenport alluded to, and that is having the orifice so as to adjust it to the temperature of the atmosphere. I don't know what experience others have had with conductors and brakemen, but I find it very difficult to get brakemen to do anything in adjusting any ventilating arrangement. It is very difficult to get them to open or close the draughts of a stove when necessary. They will have the stove red-hot, or let the fire go out. Now it is just so with ventilation. You cannot make brakemen take that into their minds. You may tell them a hundred times a day and they will never go and do it. We have automatic brakes on our road now, and the brakemen have not got anything to do with them; but we cannot get any more done than we could before. I have heard the argument used for the Westinghouse brake, that if they were used the brakemen could attend to ventilation, the registers and lamps; but the more provision you make to accommodate them and give them a chance to wait upon the passengers, the less they will do.

Mr. FORNEY—There is a very excellent plan which Mr. Garey has adopted on his road. I hope he will describe to the Association its construction and operation.

Mr. L. GAREY, of the New York & Harlem—It is simply openings at each end of the car, with air taken in over the platform through the roof of the car. They are covered with wire screens, admitting the air at the forward end and exhausting it at the rear end. It is very simple and not expensive, and not liable to get out of order, and will supply all the air required, and will exhaust all that is necessary to keep the air pure in the car, let it be any kind of weather, or if the car is in motion, say from 6 to 30 miles an hour. There is no provision for warming the air. It is simply for admitting and exhausting it. I think it admits the least dust by taking the air from the platform near the roof; with a hood projecting down from the roof, there is a less current of air at that point, and consequently less dust, than lower down over the window or the top sashes in the door, where we used to take it. The matter of ventilation is one that has been agitated for a great many years, and, if I am not mistaken, the Board of Education of Massachusetts have thought it expedient to introduce into the public schools here the theory of educating the young upon the necessity of pure air; and I think when we get our people educated on this subject we shall have very little difficulty in furnishing our public cars, halls and public places with all the pure air they may need.

Mr. FORNEY—I always knew these Yankees were great people, and I am convinced, from what Mr. Garey says, that they are greater than I thought they were, and I am half sorry I am not one of them. I rose to say a few words in regard to the system of ventilation on the Illinois Central road, when I was employed on the line. They used the ordinary Spear stove among the rest. They had other patterns. We surrounded the stove with a sheet-iron casing, and to the bottom of the casing they attached a pipe which communicated with the top of the car. On the top of the car they at one time used the fixed hood common to the Spear stove, but it was found not to admit air with certainty, and they therefore substituted for that fixed hood a hood which had a vane attached to it, and which revolved. The effect of that was, in running with a strong side wind, the vane would adjust the position of the hood in the direction of the wind, so it would always admit a more equal quantity of air than is possible with a fixed hood. After using it a short time, they found, upon making an aperture as large as was used with the fixed hood, too much air was admitted, and they cut it down; and when I left there they were using a hood the mouth of which was 4x10 inches, which they said admitted all the air that was necessary. This was carried down to the sheet-iron casing around the stove, and there was a flue which ran the length of the car and had registers for admitting the air through the length of the car. Persons, when they got warm, would close the register, and then sit there until they froze before it would occur to them to open it again. And, inasmuch as it was in an inconvenient place to reach, it was impossible for the railroad men to tend them. On the Northwestern road they removed the covers of the registers in the flue. But the best plan would be to cover the flues with sheet-iron, and perforate it with small holes that would distribute the air more equally and not incommode the passengers. There should be more registers at the farther end of the car than near the stove. I simply suggest this plan as being one that has operated well, and which I think is worthy of consideration.

Mr. R. HITCHCOCK, Connecticut River Railroad—There seems to be a diversity of opinion as to the best method of ventilating and warming passenger cars. It has usually been my custom, in the absence of knowledge, to inquire of those that I think best understand what I want to ascertain. And I would recommend in this case, that this Association do the same. There are parties that build cars, and put them upon our railroads, and which depend upon the luxuries afforded in excess of what is furnished by railway companies, for their success. I would recommend that this convention should make inquiries, and see what method of ventilation and warming such parties have introduced. I refer particularly to the Pullman Palace Car Company. It is well known that they must furnish better accommodation, better ventilation and better warmed cars than railroad companies do for their passengers, in order to get their custom. I do not see how we can agree as a body where there is such a diversity of opinion. I do not expect that air can be taken in and sent out without taking in dust. And in my own opinion, the only method that can be accomplished successfully is an exhaust and supply.

Mr. V. D. PERRY, Providence & Fishkill—As Mr. Hitchcock says, there seems to be a diversity of opinion in regard to this matter, and probably always will be. I am frank to say I do not believe any means can be devised to thoroughly ventilate a railway passenger car while in motion over our roads. If our tracks could be wholly above ground and through an open country, perhaps the theory of Mr. Davenport might be correct, that we could get air enough through a six-inch opening to supply a car-load of 40 passengers; but as we are now running over an embankment, and perhaps the next moment through a deep cut for miles, that little orifice would not amount to anything, and would be little better than nothing, in my opinion. The currents of air are different as we travel over the different roads in the country, and it is impossible, in my opinion, to thoroughly ventilate cars. I remember last summer, during hot weather, I was coming from Washington. We had a passenger car on the train with openings over the end windows, and the passengers almost suffocated in that car. They were complaining constantly, while there were openings enough, according to Mr. Davenport's idea, to admit 50,000 cubic feet of air a minute, if it came through in proportion to the size of the openings, as he claims; but as I said, the passengers were constantly complaining, through the whole trip, of suffocation and heat. It was quite dusty at the time; so much so that there were but few windows open. That is what leads me to make the remark that, in my opinion, no means can be devised to thoroughly ventilate a passenger car.

Mr. DAVENPORT—I think the difficulty in that case was, the air was too hot all round.

Mr. H. O. WADLIE, Illinois Central—Perhaps it will look a great deal like egotism on my part to undertake to instruct the master car-builders on heating and ventilation. There are, however, some few things that have been mentioned here, that, it has occurred to me there may, perhaps, be a misunderstanding about. My friend Davenport refers to an opening six inches in diameter. My friend Adams thinks his cars are well ventilated because they have a larger opening than that. But do these gentlemen take into consideration the different positions in which the orifices are situated? As I understand, Mr. Davenport proposes to have an orifice six inches in diameter, under the full pressure of a current of air with the car moving against the wind at 20 miles an hour. My friend Adams has introduced at the end of his car larger orifices, but he has another car immediately in front of it which forms, to a certain extent, a vacuum there, and therefore he does not get the same amount of pressure per inch that we have in the other circumstances, making a vast difference in the amount of air that is introduced under the different systems, with the train moving at the same rate of speed. My friend Mr. Forney suggests that perhaps the best method of testing the purity of the air was the sense of smell. It has already been remarked here that that was no criterion to go by. And, indeed, I think any one, with a moment's thought, will agree to it; from the fact, if you take a man who is habitually confined in an office, for instance, and another one who, we will say, is employed in a tan-yard, and put them upon the same seat, it will be a very difficult matter to ventilate the car to suit both of them. It may be a matter of education, however, and when we get our passengers that we carry over the road educated up to our standard, then we can do something in the way of introducing air to suit all at a time. I would simply allude to the method we are using now for warming and ventilating cars. In the cars I am now building, I use the system described by Mr. Adams as the Spear system, with the addition mentioned by Mr. Forney, of carrying what we term a "hot-air flue" from the stove along the side of a car, using registers. In addition to that, we place in the monitor deck, at each end, a sash that will swing about on two exhaust hoods, as we term them, 8 inches in diameter. This sash can be adjusted and will effectually exhaust the air in a short time. When we first turned these out, one plan was to build a good fire in the stove, and send a man on top of the car to close the stovepipe, open the arrangement for ventilation, and see the effect it would have in the car; and it cleared the car very effectually from the smoke. We also introduced air at the end of the car for summer ventilation, the same as spoken of by Mr. Adams, who has described it, with the exception that we use a netting over the opening, and raise the sash the same as the ordinary sash of the car is raised. The object of putting on the netting and raising the sash in this manner is, not to deflect the current of air, but to let it diffuse itself through the car without creating a current, which has the effect of rising and passing down upon the heads of the passengers. We think by the screen we partially break the heavy current of air and distribute it so that it mingles more readily with the air in the car, and avoids a current.

Mr. R. HITCHCOCK, Connecticut River Railroad—I think there is an objection to letting in so much air at one place in these openings over the windows. I should prefer to let it in in small quantities, and distributing it over the car more. I have sat very often near one of these openings in the third or fourth seat, and experienced a cold blast in winter and sometimes in summer. It is not pleasant to have so much air come in. If the openings must be at the end, I would say put in more of them and make them smaller.

Mr. I. W. VAN HOUTEN, Pennsylvania Railroad—I am prepared to say that, with my experience of 30 years as connected with car-building, I doubt very much whether we have yet arrived at that time when we can definitely fix the best mode of ventilating railroad cars. I acknowledge that I have not been fully educated upon that point. I have been educated to know by experience that ventilation is required; and the next point is, How can we get a proper amount to suit, and what should be given to each passenger in a car? We can average that. A passenger may ride in a car that will want a vast amount, sufficient to kill the passenger sitting next to him. Now, we don't want to give one passenger so much as to kill another, but we want to give all sufficient for their comfort. Different modes have been suggested to get this ventilation into the car. Mr. Adams' plan is to give two 6x20 apertures at the top. My friend Wadlie does not approve of that method. I think I agree with him. It may come in at the right place, but it does not properly distribute itself as it should do. I think the fresh air should be brought in at the bottom of the car, where it can distribute itself and give an opportunity for the lighter air to rise to the top. It seems to me, if it comes in at the top, it must, as it is the heaviest air, press down the foul air upon the heads of the passengers, which I think should be avoided. You want the fresh air to distribute itself near the bottom of the car, from as many openings as you see fit to make. I think we are not yet prepared to say, as a convention, what is the best mode of ventilation; and therefore I move that this question of ventilation be postponed until our next annual meeting; other questions remain in the hands of the committee who now have charge of it. There may be matters to come up which the experience of every gentleman here may bring out new ideas upon, and I want to get the best ideas we can; and if any ideas can be brought out, let the thing go over. Our final action upon it to-day, may, twelve months hence, not be what we shall want to suggest then.

Mr. W. E. CHAMBERLAIN, Boston & Albany—As one of that committee, I will say it will be necessary to receive answers from more of the master car-builders, next year, than we have received in the year past, to the circulars on ventilation. I believe we only received communications from twenty-seven different roads. It is no use to continue the committee for another year unless the master car-builders are going to put the shoulder to the wheel and keep it rolling. We know they can do something—try experiments on their own roads and report the results, and it will be easy for the committee to come together, or try the same experiments on their roads.

Mr. I. W. VAN HOUTEN, Pennsylvania Railroad—I am not positive whether I answered the circular on ventilation or not, but I presume I did not, and therefore I can more readily say that the committee may take it for granted that any master car-builder who does not answer the circular has no opinion on ventilation; and if twenty-seven master car-builders have an opinion, and answer the circulars of the committee, and if that is all that can be got at the expiration of another year, this Association may properly accept the opinion of the twenty-seven, and leave us gentlemen who have no opinion to abide the result.

Mr. W. E. CHAMBERLAIN—I would like that to be understood, if only twenty-seven give answers next year, the rest are to keep their seats. If the rest do not know anything about ventilation, let them keep still.

Mr. F. D. ADAMS—That same trouble runs through all these committees. The circulars are not answered as they ought to be, and I wish gentlemen might feel a little more interest in this matter. It seems to me they do not realize the importance of it. Now what committees are appointed for is, to bring in some intelligent reports here; and in order to do that they have got to get information from members and compare notes. We sent out circulars on all the different subjects, asking them to answer certain questions to the best of their ability. We do not expect they are going to give us an elaborate essay on these things, but we want something; we want some kind of information. I am not willing to admit but that the most of these car-builders know something. They have had years of experience, therefore they can give us some ideas.

The motion of Mr. Van Houten was then agreed to, and the subject postponed until the next annual meeting, and the committee continued.

The Illinois Railroad Law—Interpretations by the Railroad Commissioners.

The following was issued, under date of July 1, by the Railroad and Warehouse Commissioners of Illinois:

To the Public:

Some important questions having arisen under the act of May 2, 1873, to prevent extortion and unjust discrimination, we deem it proper to make known to the public our construction of certain portions of the act. We would, first, direct attention to the first section, which declares that if any railroad corporation, doing business in this State, shall charge or receive more than a fair, reasonable rate of toll or compensation for the transportation of passengers or freight, the same shall be deemed guilty of extortion, and, upon conviction, be punished by specific penalties. The avowed object of the statute is to prevent extortion as well as unjust discrimination. In making their rates of charges conform to the requirements of the third section, defining what would be *prima facie* evidence of unjust discrimination, the railroad companies must not ignore the first section, forbidding extortion. In our judgment, the rate of charges prior to this date have been in the main unreasonably high, and any increase thereof would be a clear violation of the law. The following are the questions above referred to:

First—Does the act apply to through freights as well as local freights?

Second—Does the act admit of any discriminating in a freight tariff based upon the quantity shipped, or must the railroad companies, to comply with the act, adopt one uniform rate per 100 pounds, per ton, or per car-load, regardless of the quantity or the amount of the shipments?

Third—Where two or more railroads, operated by different companies, are so connected as to form in fact one continuous line, and shipments are made from a point on one road to a point on the other, may the charge be at the rate applicable to the distance over both roads, or at the aggregate of the local rates on each road?

Fourth—Can railroad corporations hereafter issue excursion tickets?

After due consideration of these questions, we have arrived at the following conclusions:

First—The provisions of the act are applicable as well to through as to local freights, so far at least as to require that less should be charged for the transportation of domestic or local freights from one point to another within this State than the sum charged for the transportation of through or foreign freights the same distance within the State, and for its transportation from or to a point without the State. Thus the charges from a point west of the State to a point within the State must not be the same as or less than the charges from the west line of the State over the same road to the same point of destination. So the charges from a point within the State to a point east of the State must not be the same as or less than the charges from the same point of departure over the same road to the east line of the State; so, also, the charges from a point west of the State to a point east of the State must not be the same as or less than the charges over the same road from the west line to the east line of the State. The general principle is that the charges for any distance within the State must not be the same or greater than the charges for a greater distance.

Second—A reasonably less rate may be charged per 100 pounds per ton, or per car, where large amounts of freight are shipped by the same person, than where small shipments are made, without violating the act. Discriminations of this character, as upon fair business principles, were just and reasonable before the passage of the act, are not prohibited thereby, but seem to be recognized therein by the words "like quantity" frequently occurring in the third section of the act.

Third—Where two or more railroads are owned and operated by different companies, and are connected so as to form one continuous line, and either of such companies receives freight upon its road to be shipped to some point upon the other road, the same may be treated for the purpose of such shipment as one entire line, and the same rate may be charged as if one company owned the road upon which freight was shipped for the entire distance, instead of charging the aggregate of the local rates on each road for the distance shipped thereon.

Fourth—The act expressly provides that nothing therein contained shall be so construed as to prevent railroad corporations from issuing commutation, excursion or 1,000-mile tickets, as the same hitherto have been issued by such corporations.

Chicago Portable Track & Car Company.

A company with this name has purchased Mr. J. B. Brown's interest in the patent for the Peteler portable track and cars, which are now largely used by contractors for hauling earth, etc., and has its quarters in the Methodist Church block, Chicago.

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Editorial Announcements.

Removals.—The Chicago office of the RAILROAD GAZETTE *has been removed to No. 77 Jackson street, opposite Third avenue.*

The New York office of the RAILROAD GAZETTE *is removed to Room 131, No. 73 Broadway, opposite the upper elevator landing.*

Correspondence.—We cordially invite the co-operation of the railroad public in affording us the material for a thorough and worthy railroad paper. Railroad news, annual reports, notices of appointments, resignations, etc., and information concerning improvements will be gratefully received. We make it our business to inform the public concerning the progress of new lines, and are always glad to receive news of them.

Inventions.—No charge is made for publishing descriptions of what we consider important and interesting improvements in railroad machinery, rolling stock, etc.; but when engravings are necessary the inventor must supply them.

Articles.—We desire articles relating to railroads, and, if acceptable, will pay liberally for them. Articles concerning railroad management, engineering, rolling stock and machinery, by men practically acquainted with these subjects, are especially desired.

Advertisements.—We wish it distinctly understood that we will entertain no proposition to publish anything in this journal for pay,* EXCEPT IN THE ADVERTISING COLUMNS. *We give in our editorial columns* OUR OWN *opinions, and those only, and in our news columns present only such matter as we consider interesting and important to our readers. Those who wish to recommend their inventions, machinery, supplies, financial schemes, etc., to our readers can do so fully in our advertising columns, but it is useless to ask us to recommend them editorially, either for money or in consideration of advertising patronage.

THE ILLINOIS LAW AND THROUGH TRAFFIC.

The Illinois Railroad Commissioners have announced that they understand that the law prohibiting discriminations applies to all shipments carried in the State, though made to or from points outside of it. That is, they will consider a railroad company to have been guilty of "unjust discrimination," within the meaning of the law, and therefore to have merited prosecution at their hands, if it shall charge as little or less for carrying a given amount of freight to some part outside of the State as it does for carrying the same amount to a less distant point within the State. The Chicago, Burlington & Quincy must charge more from Chicago to Hannibal than to Quincy, more to Burlington than to Sageto wn; the Illinois Central more to Dubuque than to Dunleith; the Chicago & Northwestern more to Clinton than to Fulton, etc. This is substantially a command that rates across the State shall be very nearly the same per mile as the long local rates. A very large number of the Illinois roads have termini on the east bank of the Mississippi, and by the addition of a mile or so reach the Iowa or Missouri bank, where they receive the traffic of roads, owned by themselves or by independent companies, from the West Now, if the traffic of these roads must pay the same rate per mile as the traffic originating in Illinois, on its way to Chicago or across the State, either Iowa and Missouri must stop shipping coarse produce, like grain and stock, or they must find routes to and from the East which do not cross Illinois. Here is the Chicago & Northwestern, for instance, with a rate on wheat of 13.2 cents per bushel from Fulton to Chicago, and 10.08 cents on corn The Chicago, Burlington & Quincy rate is 11.81 cents per bushel on corn from Quincy to Chicago. Now if this rate is charged on all shipments made from points west of the river (and they are made from places 300 miles west, and further), and shipments continue to move by this route, this rate probably would be unnecessarily large to produce the requisite income. But since such a rate—at least any rate equal to that to the more distant stations in Illinois—will make it unprofitable to ship from Missouri and Iowa—will, indeed, be a prohibitory rate on that traffic—it is evidently for the interest of the companies and their Illinois patrons that they should make rates on the trans-Mississippi shipments low enough to secure that traffic, if such rates will leave them the smallest profit. Cut off that traffic and the roads must be supported by the Illinois traffic alone; with it, Iowa and Missouri and the countries further west will contribute something to their support.

The error in the purpose of the law (if this is its purpose, as we presume it is), as in so many other criticisms of the conduct of transportation, is in assuming that unless work is done for all persons and places at equal rates of profit, injustice is done to those who pay the higher profits; and this error is a consequence of assuming that an increase in traffic on a railroad must be accompanied by a proportional increase in *all* the expenses—a fallacy which we have often pointed out, but which critics of railroad charges are very slow to understand, being indeed disinclined to listen to any demonstration of it. A road and equipment costing $40,000 per mile to make 8 per cent. on its cost with working expenses equal to two-thirds of its receipts must have gross earnings of $9,600 per mile. In this case every bushel of grain on which the freight is 12 cents pays four cents toward the interest on the investment. Now suppose we accept a traffic from Iowa or elsewhere amounting to $2,400 per mile at rates which leave net earnings of only 16⅔ per cent. This will add $400 to the net income, *and reduce by one-eighth the tax on the other traffic necessary to pay the interest on the investment.* So the bushel of corn which formerly paid four cents will now pay but 3½ cents to the stock and bondholders, and the shipper will certainly have no reason to complain, although the more distant shipper contributes little more than half as much for that expense—unless indeed these distant shipments could be secured at higher rates. Great quantities of traffic are carried on all or nearly all roads which, if there were no higher-priced traffic, would not pay expenses—that is, capital and working expenses—but every intelligent traffic manager endeavors to secure any new traffic which, without requiring an addition to the capital invested, will pay any profit over working expenses alone. Doubtless often a mistake is made, and traffic is accepted which does not even pay working expenses, for reasons which could not be foreseen or were not taken into account, and such traffic of course is a tax on the paying traffic. Oftener, doubtless, traffic is accepted at rates which for the time are non-paying, because it is believed that in this way a profitable business may be developed in a year or two or three. Every railroad company is urged frequently to "build up" such kinds of traffic, and frequently refuses to make the low rates when there is a fair prospect of developing the profitable business offered as an inducement, simply because the development of a new business through rates temporarily unprofitable is in reality an investment of additional capital to the amount of the temporary loss on the business, an investment which the law does not recognize, and one moreover which the company may not be in condition to make, at least to the extent desired. It is with the company as it is with many business men, who see clearly that an additional investment in their business would be very profitable, which investment they yet fail to make, simply because they haven't the money, and must take part or all of their profits for their personal and family expenses. This is especially the case with suburban traffic, which is usually developed with great cost, often refuses absolutely to be built up after all the expense, but once well developed may be extremely profitable to the railroad company, though very much more so to the fortunate owners of land at the suburban stations who so earnestly beseech the companies to run trains unprofitably for three or four years for the sake of further possible profits, but so seldom are willing to share any of the expense which is to multiply the value of their lots tenfold.

The working of the Commissioners' interpretation of the law will be simple, if, as we suppose, the lowest local rate that can be made, which will still be high enough to afford sufficient net earnings, will be prohibitory on most of the shipments from points west of the Mississippi. If they are not, then the trans-Mississippi shippers must be taxed to relieve the Illinois shippers. Otherwise the roads will receive no trans-Mississippi shipments, will have to be supported (if they are supported) by the Illinois business alone, while the trans-Mississippi country must either cease shipping and receiving freight, or else must find routes which do not cross Illinois.

The latter course, doubtless, will be the one pursued. If the Illinois law forbids the carrying of grain to Chicago for less than local rates, the Milwaukee & St. Paul and the Lake Superior & Mississippi roads will doubtless be ready to carry all the grain turned away from Chicago to Milwaukee and Duluth for such a rate as it can afford to pay, though less than the local Wisconsin and Minnesota rates. Then we shall have steamboats carrying grain *up* the Mississippi from St. Louis, Louisiana, Hannibal, Quincy, Keokuk, Burlington, Clinton and Dubuque to Prairie du Chien, La Crosse and St. Paul, as they now carry it down to Dunleith and Fulton. Then, too, there will be an opportunity such as never before offered for developing a grain traffic down the Mississippi by way of New Orleans to the sea, a movement which all the roads running west from the Mississippi will then aid as they have hitherto opposed, the Illinois law, like a second Appalachian chain, rising up as a barrier to through shipments eastward.

The opinion of the Commissioners, of course, does not settle the interpretation of the law, but it is equivalent to an announcement that rates which are contrary to this interpretation will subject the companies making them to prosecution by the Commissioners, which is exactly what the companies have tried to avoid by their new tariffs; for they doubtless would readily defend any suit for unjust discrimination or extortion based on their old rates, did the law consider them innocent until proved guilty; and they might have a good defense for a total neglect of this provision of the law, on the ground of its unconstitutionality, but are disinclined, except as a last resort, to so contest the validity of the law, since such action would be taken by many as a defiance of the law, and might lead to a shameless revolution in the State judiciary, which would for many years, until the authority of the United States Constitution could be enforced over State decisions contrary to it depreciate immensely the value of all railroad property in the State and beyond it, and indeed of almost all property in the State, while ruining its present good character and credit.

It is not to be supposed that the Legislature or the people of Illinois desire to do any great injustice, or to benefit themselves at the expense of other communities, and certainly not to *injure* themselves at the expense of the railroad companies and of other communities. Doubtless, in their present temper, and while their heavier products have so glutted the market as to reduce the price with the consumers to scarcely enough to pay the absolute cost of carrying them from the more distant producers, the people are quite careless as to any injuries that the railroad companies, which they charge with their sufferings, may incur, by any measures from which the customers of the companies may profit; but such injury is not the object of their acts. The law was passed as a blind effort after relief, without a sufficiently careful calculation of its natural effects. What these are we have seen, and it is worth noticing that similar laws in the States east of Illinois would shut a large part of that State out of its markets, and injure terribly all the rest. And we do not mean by this that such laws would establish from Illinois to the seaboard rates equal to the current local rates on the intervening railroads; but that such an adjustment of rates as would give an equal percentage of profit over expenses on through and local tariffs would make the former so high as to prohibit the shipment of any but the more valuable merchandise to or from points as far distant as Illinois from the sea. The whole prosperity and progress of the West depend upon such a discrimination as makes the profits on through rates small and those on local rates comparatively large.

The Education of Cadet Engineers at the United States Naval Academy.

Nothing better illustrates the growing importance of the science of mechanical engineering than the action of the national legislature in establishing at the Annapolis Naval Academy a training school for its engineer officers. From the fact that steam, in the navy, has entirely superseded the use of sails as a fighting motor, it was recognized that such a school was a necessity, as it was of the utmost importance that the Navy Department should continue to have at its command the services of a corps of skilled engineers whose ability would warrant high trusts and important duties, and whose interests would be the interests of the Government. Such officers were already to be found in the existing engineer corps; but after the war, the difficulty of obtaining suitable men to fill the vacancies in the lower grades became so great as to attract the serious attention of Congress to the matter; and a law was passed, enacting that thereafter naval engineers should be educated at Annapolis. Under this law a class of cadet engineers was formed, and the result has fully justified the wisdom of the measure.

The course continues four years, and includes instruction in the designing and practical management of steam machinery, physics, applied mechanics, mathematics, chemistry and practical instruction in the use of tools, including forging, casting, pattern making, lathe and planer work—in short, everything pertaining to the manufacture of marine engines. The question of economy in the use of fuel, being one of such grave importance, is made the subject of special interest. The study of the

mechanical effect of heat, and the most simple and economical method of producing and controlling it, is carefully pursued. The investigation of the laws of nature, the properties of gases, the laws of stability, the strength of materials, and the propulsion and resistance of ships, form the subjects of interesting lectures. With a course so thorough, with studies regulated by the strictest rules, and instructors selected from among the best officers in the service, with the moral and physical, as well as the mental tone, properly cared for, the result cannot be doubtful.

We have long and persistently advocated the combination of theory and practice, and here we have it carried to minute details, and invested with the peculiar charm and attractiveness of military discipline—the discipline that exacts implicit obedience and a respect for authority that so eminently fits a young man for after life, and is the foundation of broad views and liberal-mindedness.

The care and management of marine engines require great resources—resources that are able with few facilities to accomplish important results, for on shipboard it is impossible to carry the various remedial appliances necessary in case of casualty, and the engineer has to rely solely upon his inventive faculties to make the most of what he has. Many a disabled steamship has been skilfully brought into port when it has been thought impossible to remedy the disaster.

In the establishment of this system of educating its engineers, the government has been actuated by the policy of retaining for itself the best talent, and, foreseeing the future great importance of mechanical science, it has, in the adoption of this plan, solved the problem of securing a class of men thoroughly versed in the practical and theoretical details of their profession, and it is but natural to predict that the result will fulfill the most sanguine expectations and prove the measure to have been a wise and thoughtful one.

Two Noteworthy Butting Collisions.

A gentleman cognizant with the facts has given us the following account of a recent railroad collision:

"The operator at station A received an order to hold No. 2, an east-bound freight train, until the arrival of the gravel train and freight No. 1, west-bound trains, also an order to the conductor and engineer of No. 2 to wait for and pass those trains at station A. When they arrived at A, No. 1 had also arrived, and the operator had gone to dinner and left on his desk the order to the conductor and engineman. The conductor found this order, and signed for himself *and the engineman* (contrary to the rule, which requires each to sign for himself) their understanding of it. They then started on with No. 2, though the gravel train had not then arrived, precisely as if they had received no order at all. The result was a collision with the gravel train which caused death and damage to the extent of several thousands of dollars.

"It appeared upon investigation that the conductor and engineman, seeing No. 1 on the side track, took it to be the train referred to, and did not read their order nor their 'understanding' of the order, regarding it only as a matter of form.

"In this case the operator was probably instructed to hold No. 2 at A until No. 1 and gravel train had arrived. It does not appear but that he held the train as required; but for the order to be valid, the 'understanding' of it must be indorsed with the signatures of the engineman and conductor, *in the presence of the operator*. This understanding must be telegraphed back to the train dispatcher, and his 'correct' must be received and indorsed by the operator on the order. Now, in this case the first neglect was in the conductor, who did not read the order, did not read and sign it in presence of the operator, and signed for the engineman; the second fault was in the operator, who, coming back from dinner, accepted the signatures he found on the 'understanding' without having heard the conductor read it aloud in the presence of the engineman and without having seen them both sign it; and the third fault was on the part of the engineman, who permitted the conductor to read and sign for him what the rules require him to hear and sign for himself. It was indeed a case of compound negligence, in which the checks provided by the rules in requiring three persons to make the order valid were done away with by two of them trusting to the third and that third neglecting to read the order. These three persons were certainly in a very bad state of discipline. It was found, however, that though they were virtually accessories to a manslaughter, under the existing laws they could not be indicted for any crime, and the only penalty they could be made to suffer was dismissal from the company's service—which may and may not cause them to lose a few weeks' wages while looking up a new place."

A correspondent who happened to be near by at the time writes as follows of a recent butting collision on the Toledo, Wabash & Western Railway near the Illinois River:

"It occurred between a sand train bound west and an extra engine bound east, both trains being, according to the rules, third class. The engineer of the sand train failing to get orders at Chapin to run to Bluffs (six miles) against No. 6, started out intending to flag his way. Neely, a station about half way, was passed in safety; but upon a very crooked piece of track and upon a down grade the extra engine was met. It is almost unnecessary to add that the flagman was on the engine. The engineer of the extra engine had orders to run to Springfield, avoiding regular trains and keeping a sharp lookout for sand train between Bluffs and Chapin.

"I am not very well versed in railroading, but it certainly seems to me that a system that would allow even the possibility of trains meeting between stations upon a single track is very much behind the present advanced age. I send copies of a few of the rules relating directly to this circumstance:

"'RULE 45.—Trains are classified and have the absolute *right to the road* in the following order: First class, second class and third class. Regular passenger trains are *first class*. Regular freight or mixed trains are *second class*. All other trains are *third class*.

"'RULE 48.—*Trains going east* shall have the right to the road against all *trains going west* of the same class,' etc., etc.

"'RULE 102.—A conductor shall not *assume the rights* or take the time of another train without special orders from the Superintendent.'

"I have it from good authority that the engineer of said train, having failed to get orders at Chapin, asked what he should do. The answer was, 'Use your rights.' He again asked, 'What are my rights?' The answer came, 'Use a flag.' Now if this be so, it can be plainly seen why Rule 55 was incorporated in this code. It reads as follows:

"'RULE 55.—When trains flagging curves *meet between stations* the train nearest to a siding suould be backed, provided it does not endanger the safety of either train or violate a rule.'"

Free Passes.

Free passes seem to have affected some minds like a superstition. They did not know exactly what good purpose they served and they did know much evil in them; but they had a vague fear that to do away with them would bring all manner of terrible calamities. So those who have ventured to move toward the abolition of the practice have done so usually with fear and trembling. A little experience serves to dissipate some of these superstitions, and to show that a company does not necessarily lose its income from passengers when it ceases to carry people free. One company, which has a sharp competition for all its through traffic and is among the largest carriers of passengers, having about the 1st of May last year begun a reform, limiting greatly the issue of passes, had a considerable increase of through traffic for the succeeding eight months of the year though it had had a decrease for the four months preceding the reform. So far from its neighbors taking advantage of its action to cultivate traffic by the use of passes, one of them at least complained bitterly that this action of a competing road had flooded it with deadheads, who, we may be sure, will never patronize the road that issues no passes so long as they can find another which can carry them on their way to give them.

Mr. J. Edgar Thomson, President of the Pennsylvania Railroad Company, is reported in one of the Chicago papers as saying that the reform could not be made because some companies would fail to keep the agreement, and that when one uses passes another must in self-defense. It seems to us, however, that the success of the reform depends very much upon the action of Mr. Thomson himself and his coadjutors. Very little traffic which his road gets now could be diverted from it by any blandishments in the form of passes from any other railroad, except the transportation of the deadheads themselves, which it could cheerfully abandon to its competitors, and the most of it to the most detested rival; but there may be more than one company which will fear to give up the practice so long as the Pennsylvania retains it, and many others with which its example will have great weight. It is questionable, however, whether the holding back of one company is a legitimate reason for another to fail to abolish the practice. Think of one line between New York and Chicago or St. Louis with a monopoly of the pass business!

The Chicago agreement, substantially as described week before last, was signed by representatives of the Chicago, Burlington & Quincy, the Illinois Central, the Chicago & Iowa, the Chicago, Pekin & Southwestern, the Chicago & Paducah, the Chicago, Rock Island & Pacific, the Chicago, Danville & Vincennes, the Chicago & Northwestern, and the Chicago, Milwaukee & St. Paul companies. It is reported that General Manager Howe, of the Northwestern, and President Hinckley, of the Chicago & Iowa, the Chicago, Pekin & Southwestern and the Chicago & Paducah, opposed the arrangement in the form in which it was signed, that several companies desire to continue to issue half-fare tickets to clergymen settled on their lines, and that the Chicago & Alton will have nothing to do with half-way measures, or 99 per cent. measures, for that matter, and announces that all season passes issued will be called in, and that hereafter it will have no use for pass blanks. We do not know that any of the roads having no termini in Chicago, or not worked in connection with the Chicago roads, have made such an agreement, so the bummer may still hope, even if it is hard for him to get to (or out of) Chicago *on the West*.

Responsibility for the Conduct of Passengers.

We noted some time ago a decision by a New York city court under which a verdict was brought against the Broadway & Seventh avenue Railroad Company for damages for negligence of its servants, whereby Avery D. Putnam met his death at the hands of a drunken passenger, William Foster, who was afterwards tried, convicted and hung. An appeal was made by the railroad company to the General Term of the Superior Court, which last week rendered a decision confirming the decision of the court below. The plea that Putnam had ceased to be a passenger when he was attacked, having one foot on the ground and one on the car-step, is held to have no weight, since the conductor and driver were bound not to carry a passenger who was evidently intoxicated, and therefore liable to cause offense or injury to quiet passengers. The court held that not only is the carrier bound to protect passengers from the assaults of one of their number and authorized to refuse to carry or to eject maniacs, intoxicated men and others from whom there is reason to fear any outrage, but that it is its duty to refuse to carry persons of the latter class, and to eject them if it has received them unwillingly. This last is a matter which conductors should bear in mind. It is not simply lawful to eject such persons, but it is unlawful not to eject them, and they will not be justified in waiting for them to begin a quarrel before putting them out. This deciding whether a man is a dangerous character is a delicate duty and often very difficult, but it is to be supposed that no man would be held guilty of negligence unless it is pretty clearly shown that the offending person was manifestly a nuisance.

In this special case, we will not presume to say what the facts were, but it should not be a cause for complaint that carriers are held strictly to the maintenance of order and decorum on their vessels and vehicles. The passenger usually cannot escape from them without risk to his life, and the only authority to whom he can appeal for protection is that of the carrier's servants. It is a common offense in street and a not uncommon one in steam cars, for men brutally or noisily drunk to ride, making themselves nuisances, if nothing worse, to all sober inmates of the same vehicle, and it is much to be desired that the companies should be made to abate the nuisance.

THE DEVIL IN THE FORM OF A TRAIN-WRECKER has shown himself several times and in widely separated parts of the country recently. On the 27th of June a passenger train on the Illinois Central Railroad struck two rails which he had placed on the track on an embankment, though without damage. Before light on the morning of the 28th an east-bound passenger train on the Chicago, Burlington & Quincy ran into a pile of stones which some of his imps had gathered from an adjoining culvert and heaped up on the track, a few miles east of Mendota, and the same day a west-bound train ran into a similar pile a few miles further east, in this last case disabling the locomotive and delaying the train two hours. While the prevailing hostility to railroads can hardly be charged with the commission of these crimes, it is probable enough that the villains who have been guilty were inclined to take this particular step in crime because they felt that the railroad companies would not get much sympathy; just as a California "hoodlum" stones a Chinaman rather than another, because the people generally hate Chinamen. Earlier in the month (on the night of June 17) a pile of timber, iron, etc., was found on the track of the Erie Railway, near Clifton, N. J., and in this case, we are happy to say, the perpetrator was detected and arrested. The night before an unsuccessful attempt was made to wreck a Chicago, Burlington & Quincy train near Peoria.

The day before, near Dayville, Conn., on the Norwich & Worcester Railroad, a passenger train encountered a plank, and a little further on a tie, which latter caught fast near a bridge and tumbled the engine into the bed of the stream, fatally injuring the fireman, and less seriously the engineman and a brakeman. Large rewards have not secured the criminal. On the morning of the 24th another attempt was made to wreck a train near the same place, but the two ties which had been placed across the track were discovered a few minutes before the train passed.

PERSIA, it is reported, is about to ask proposals for a loan in the European money markets, ostensibly for the purpose of constructing railroads and other public improvements, but really, it is insinuated, to supply the failing exchequer of the Shah, who has "expensive tastes" and a poverty-stricken and indolent people, yearly decreasing in number and wealth, to collect taxes from. It is said that his present visit to Europe, blazing in diamonds and jewels, heralded by a troop of "special correspondents" and long telegrams in all the European newspapers, is only a smart trick to affect the imaginations of the impressible and create that notoriety which seems the necessary first step to credit. The story goes that as soon as he has gone, leaving the glitter of his diamonds and the gorgeousness of his retinue fresh in the memory of Europeans, the loan will be advertised, and, it is supposed, taken up by the impressible, who are guided in their investments by their imagination rather than their reason and who, strange to say, are sometimes possessed of capital, though, doubtless to the public advantage, do not often remain possessed of it. This is a not uninstructive example of the way in which many loans, for railroads and other purposes, are secured now. A great deal of talk and show and bluster, the securing of the influence of a considerable part of the press by hook or by crook (generally by hook—baited), and then a great assumption that all which has been said is true beyond question, often succeed in floating enterprises of great extent and the dispersion of many millions of capital, part of which sticks to the hands of the "enterprising projectors," while part goes into long banks of earth, ditches, tunnels, and lines of rails more or less rusty.

CHICAGO TRAFFIC is reported for the six months ending with June in tables of the number of barrels, bushels, pounds, animals, etc., which we have reduced to car-loads. The largest single item is lumber, of which about 61,800 car-loads were received (scarcely any of it in cars, however,) and 46,400 car-loads shipped. The shipments were chiefly by rail, though the canal takes a large amount, and almost entirely by the lines westward. But while lumber was the largest single item, the various grains and flour together more than balanced it, the receipts (by rail and canal) being about 85,000 car-loads, and the shipments (probably two-thirds by lake) 72,800 car-loads. Of these, 39,000 car-loads received and 30,400 shipped were corn; 17,600 received and 16,800 shipped, wheat; 11,440 received and 11,050 shipped, flour; 12,700 received and 11,200 shipped, oats. The receipts of cattle were about 38,000 car-

loads, and the shipments 19,125. Of live hogs 22,200 car-loads were received and 11,700 shipped. The only other item of more than 10,000 car-loads is cured meats, of which about 10,100 car-loads were shipped, only 1,300 car-loads having been received. The turning of hogs into cured meat is, it will be understood, the leading manufacture of Chicago.

Taking the articles reported—all the grains, flour, stock and stock products (including lard, tallow, butter, hides and wool), high wines, potatoes, lumber and salt, we have a total of about 225,000 car-loads received and 175,000 shipped. This would give daily 1,250 car-loads received and 975 shipped. This, however, excludes all merchandise, coal and iron, and is not an index to the traffic of the Chicago railroads, but only of the importance of the staples named in that traffic.

THE PREVAILING HOSTILITY TO RAILROADS, in this country, was mentioned in a recent speech before the Cobden Club, at Greenwich, England, by Mr. David A. Wells, who said: "A recent examination has shown that if we compare the cost of moving a ton of freight upon the Belgian and Massachusetts railroads with the prices paid by each respectively for services, fuel and commodities, the American railways of to-day do their work 50 per cent. cheaper than the cheapest railroad system of Europe, while nominally the cost in Massachusetts is three times greater than the cost in Belgium."

POOR'S RAILROAD MANUAL for 1873-74 is out a little later than usual, a little bigger (739 pages), on the same general plan, so far as we have examined it, and with an introduction giving statistics and compilations from the material in the Manual worth all the previous introductions to the Manual put together. We shall quote from it hereafter.

NEW PUBLICATIONS.

*Shreve's Treatise on the Strength of Bridges and Roofs.**—Mr. Shreve has produced a book which is, perhaps, more satisfactory to the majority of practical engineers than any previous work upon the strains of framed structures. He begins with the simplest principles of the subject, and by an inductive course of algebraic reasoning carries the reader through most of the different forms of built beams, giving the methods of computing the strains upon the several members, with examples worked out for illustration. There is nothing in the whole work but can be readily understood by the ordinary professional reader, and nothing is taken for granted except the ordinary elementary principles of mechanics.

He has adopted an almost entirely original method of treating the subject, which possesses the great merit of being applicable to all forms of trusses. He is, indeed, the only writer who has pursued the same systematic course of reasoning through all the different forms of trusses of which he treats. Rankine's method of sections, it is true, is applicable to every form of framing; but as given by the author and applied by Unwin and others it is somewhat complex and unintelligible, and is rarely understood by practical engineers who have no time to waste in trying to study out what an author means. At the present day, in order to make a book valuable it must be inductive in its reasoning and as simple and concise in its mathematics as the subject will admit of. Very beautiful demonstrations in the higher mathematics are oftentimes wasted, because those who can comprehend them are generally too much occupied to devote themselves to such reading. It also very often happens that the most elaborate trains of reasoning by the calculus and higher mathematics are made upon insufficient premises and erroneous assumptions, which lead to inaccurate results not readily perceptible to the general reader.

This is particularly the case with those authors who reason analytically upon the strains to which a beam is subjected when loaded, and deduce therefrom curves of strains representing the forces acting upon the different members of a truss.

The method adopted by Mr. Shreve of regarding the strains upon the several members of a truss as a mechanical problem in which the actual existing forces under certain conditions are to be considered, is undoubtedly the best. It is the one generally preferred by English and American engineers, and is theoretically the most correct.

Not the least of the advantages of Mr. Shreve's book are the admirable manner in which his meaning is expressed and the simple nomenclature adopted. He is always so clear as never to leave the reader in doubt, and avoids the use of such meaningless terms as "shearing strain" or "shearing force," for the diagonally transmitted force along the truss, which has become so common among English writers. That it is not a shearing force is very easily shown.

On the whole, Mr. Shreve has produced a book which is the simplest, clearest and at the same time the most systematic and with the best mathematical reasoning of any work upon the same subject in the language.

Among the refinements of the subject introduced by Mr. Shreve is the consideration of the counterstrain produced by the partial loading of the next panel whenever one panel becomes fully loaded by a progressive load. Although this and likewise the stiffness of the chords and rigidity of the joints of a truss have the effect to diminish the maximum computed strain upon any one brace from a rolling load, they will rarely be taken into consideration by the practical designer of bridges; as the differences are on the safe side, are somewhat indeterminate, and are generally within the difference of opinion regarding the value of the factor of safety and the probable strength of the materials used. It is well, however, in an elementary work to discuss all of the above-named points, and ascertain their ordinary effects upon the strength of the structure.

It is to be sincerely hoped that Mr. Shreve will give us another volume treating upon the forms of framing which he has omitted, and the practical considerations which should govern the proportions and construction of bridges and roofs—such as the best systems of riveting and joining plates, the best form and proportions for links and pins, and, in fact, all such details as are usually acquired by practice and experience in the engineering profession.

A general digest of all the more recent experiments upon iron and steel, showing the effects of repeated strains upon the metals and their final limit of elastic endurance under different circumstances, would be exceedingly valuable in connection with a work on bridges: but it is thought that the matter is of such magnitude that only an abstract and references to authorities could be given within the limits of a work on the theory of bridge construction, although it properly is a part of the subject. The short chapter upon the resistance of materials at the end of Mr. Shreve's first volume is evidently entirely out of place.

* Treatise on the Strength of Bridges and Roofs, with Practical Examples for the Use of Engineers and Students. By Samuel H. Shreve, A. M., C. E. 1 volume, 8vo, 346 pages. New York, published by D. Van Nostrand.

AMONG THE SHOPS.

PHILADELPHIA & READING RAILROAD FOUNDRY.

The following description of the Reading Railroad foundry is intended to complete the account of the shops of that company at Reading which was left incomplete last week:

The building, which is a very substantial structure of brick, is of an L form, the smaller wing 100x60. This part is used for a "bench moulding" room, core-oven, etc. The main wing is 80x236 feet, is high and well ventilated, the side walls being 27 feet to the eaves, and 27 more to top of roof. There are four cupolas, two of which are used in wheel work exclusively. The four are capable of melting 120,000 pounds of metal per day. The usual number of wheels made per day is 126, but at the time of our visit only 112 were cast per day. There are two ten-ton cranes for heavy work and twelve wheel cranes. Thirteen wheels are moulded to each crane. Sixty annealing pits receive the wheels after they are cast. Each of these holds thirteen wheels. After they are filled they are covered with a cast-iron cover and sealed with clay. Each of the pits is connected by a flue from the bottom with a chimney. This creates a downward draft through the hubs of the wheels, thus cooling them in the center first. They are left in the pits for six days. The wheel metal is run from the cupolas into a large reservoir, to be thoroughly mixed, and is then carried to the moulds in ladles.

A large core-oven is situated near the cupolas for drying the cores for the wheels. It has five large revolving shelves ten feet in diameter, not unlike an ordinary castor in construction, on which the cores are placed, which can thus be introduced and removed without making it necessary for those who have the care of it to enter in or breathe the heated air of the oven.

The blast for the wheel cupolas is supplied by a blowing engine, and that for the other cupolas by two Mackenzie blowers. A stationary engine with 12 by 36-inch cylinder, built by Milholland, Martin & Co., of Harrisburg, a firm which we believe is no longer engaged in business, supplies the power.

Each cupola is provided with a hydraulic lift for elevating the charge of coal and iron. The drop for breaking old castings is also worked with a hydraulic lift. The power is supplied to these by a pump in the engine room which is made to work automatically by a very ingenious attachment which we could not make clear without an engraving. About 230 men are employed in the foundry.

FORGE.

Not far from the foundry, but on the opposite side of the track, is the forge for doing heavy work. It has three Kirk hammers, three heating furnaces and one puddling furnace. All the heavy axles, shafts and other forgings are made here. About 36 men are employed in it.

ENGINE HOUSES.

About a mile north of the machine shops the company has built two large engine houses of the usual circular form. We had not the time to visit these and saw them only at a distance. All we can say, therefore, is that their design is decidedly more picturesque than such structures usually are, and in that respect at least they are worthy of imitation.

ROLLING MILL.

This company has also a very complete rolling mill for manufacturing its own rails. We had but a very short time to visit this and can therefore do very little more in the way of description than give a few statistics which we gathered as we looked through. The main building is 480 by 90 feet with two wings, one 180 by 90, the other 90 by 90 feet. It has four trains of rolls, and seven sets of three high rolls. The power is furnished by three engines with cylinders 40 by 40 inches. The fly-wheels are 30 feet in diameter and weigh 70,000 pounds each. The engines were built by George W. Snyder, Pottsville. The mill has twelve puddling furnaces, eight heating furnaces and two reheating furnaces.

The rails made for the main line of the road weigh 68 pounds, and those for the lateral branches 56 pounds per yard. The mill is one of the most complete in the country. It is under the management of Mr. W. E. Coxe.

To Remove Feet from Car Seats.

The Indianapolis *Journal* relates the following:

"A Cincinnati drummer, who, with the aid of his feet, filled two seats on the morning train of the Indianapolis, Cincinnati & Lafayette road, a few days since, and who was too ugly to move, though the car was crowded, was completely upset when the conductor quietly took out his foot-rule, and after deliberately taking the measure of his feet, announced in a loud tone, 'Eighteen and three quarter inches!' the great roar of laughter all through the car which followed causing the fellow's feet to come down in a hurry, as he made himself as small as possible in the one seat that he paid for."

General Railroad News.

PERSONAL.

—Ex-Chancellor Abram O. Zabriskie, of New Jersey, who for many years was a director of the New Jersey Railroad & Transportation Company, died at Truckee, Nev., while on his way homeward from California, June 30.

—Gen. W. H. Sidell, formerly well known as a civil engineer and connected in that capacity with the Erie, the Western of Massachusetts, the Panama and other railroads, died in New York, June 30.

—Mr. H. D. V. Pratt, Superintendent of Transportation of the Erie Railway, has been granted leave of absence to recruit his health. During his absence his duties will devolve on Mr. James C. Clarke, Superintendent of Road.

—Mr. John W. Garrett, President of the Baltimore & Ohio Railroad, will shortly leave Baltimore on a trip to Europe which will last several months. The trip is taken by Mr. Garrett on account of ill health. During his absence, the duties of his office will devolve upon Mr. John King, Jr., First Vice-President.

ELECTIONS AND APPOINTMENTS.

—At the annual meeting of the Erie Railway Company in New York, July 8, the following board of directors was chosen: Samuel D. Babcock, George H. Brown, Herman R. Baltzer, Samuel L. Barlow, W. Butler Duncan, Giles W. Hotchkiss, William T. Hart, Adrien Iselin, John Taylor Johnston, Henry L. Lansing, Edwin D. Morgan, Cortlandt Parker, Homer Ramsdell, Lucius Robinson, Frederick Schuchardt, William W. Shippen, Peter H. Watson. The new directors are George H. Brown, Herman R. Baltzer, Giles W. Hotchkiss, William T. Hart, Adrien Iselin, and Lucius Robinson, who take the places of John A. Dix, John J. Cisco, J. V. L. Pruyn, George T. Olyphant, A. S. Diven and George Day. Mr. Brown is President of the New York, Boston & Montreal, and Mr. Hart, President of the New York & New England (late Boston, Hartford & Erie). Mr. S. L. Barlow held proxies for $61,000,000 of stock, on $41,000,000 of which he voted. The new board has not yet elected officers, but doubtless Mr. Watson will be re-elected President. Not one of these directors, we believe, is in the present Atlantic & Great Western board, though three of them at least have been intimately connected with that company. Besides Mr. Hart, Mr. Watson, Mr. Barlow and Mr. Duncan are directors of the New York & New England Company. Mr. Duncan, Mr. Barlow and Mr. Brown are directors of the Central Vermont Railroad Company.

—On the 9th. inst. Leland Stanford, C. P. Huntington, Mark Hopkins, E. H. Miller, R. Robinson, C. H. Cummings and William E. Brown were chosen directors of the Central Pacific Railroad Company.

—The stockholders of the Prince Edward County Railway Company organized the company at Picton, Ontario, recently by electing Henry Starnes, Walter Ross, Charles Bockus, Henry Hogan, T. E. Foster, Henry Shackell and Maurice Cuvillier directors. Henry Starnes was chosen President, C. Bockus Vice-President, and C. E. Legge, of Montreal, Chief Engineer.

—At the annual meeting of the Erie & Niagara Railway Company, July 1, the following board of directors was chosen: William A. Thompson, Queenston, Ont.; Milton Courtright, Erie, Pa.; O. S. Chapman, Canton, Mass.; Sidney Dillon, John Ross, B. F. Ham, Kenyon Cox, New York. William A. Thompson, was chosen President. The directors are all connected with the Canada Southern.

—Mr. N. P. Jacobs, late of Detroit, Mich., has been appointed Land Commissioner of the Northern Pacific Railroad for the Pacific District. His office is at Kalama, Washington Territory.

—Mr. R. S. Van Rensselaer, of Bordentown, N. J., has been appointed Chief Engineer of the North & South Jersey Railroad.

—Mr. H. B. Smith has been appointed General Freight Agent of the Indianapolis, Peru & Chicago Railroad, in place of Mr. L. N. Andrews, who has resigned on account of failing health. Mr. Smith has for several years been local agent of the road in Indianapolis.

—At the annual meeting of the Lafayette, Muncie & Bloomington Railroad Company, at Lafayette, Ind., July 1, the following board of directors was elected: Adams Earl, H. T. Sample, Moses Fowler, Lafayette, Ind.; W. J. Templeton, Oxford, Ind.; A. B. Givin, Frankfort, Ind.; John Green, Tipton, Ind.: J. S. Buckles, Muncie, Ind.; J. B. Falley, John K. McMillan, H. Y. Morison, David Kemp, N. E. Tomlinson, C. E. Shipley. The directors chose officers as follows: President, Adams Earl; Vice-President, John Green; Treasurer, Moses Fowler; Secretary and Chief Engineer, E. M. Talbot.

—The stockholders of the Bingham Canyon Railroad Company, at a meeting held at Salt Lake, Utah, July 1, elected the following directors: Charles W. Schofield, New York; Benjamin W. Morgan, Pittsburgh, Pa.; William B. Welles, Detroit, Mich.; John M. Haskell, San Francisco, Cal.; Hugh White, Salt Lake City, Utah. The board elected Charles W. Schofield, President; B. W. Morgan, Vice-President, and W. B. Welles, Secretary and Treasurer.

—At the annual meeting of the Northwestern Union Railroad Company in Chicago, July 2, the following directors were chosen: John F. Tracy, M. L. Sykes, Jr., New York; William H. Ferry, J. H. Howe, H. H. Porter, Chicago; E. Marriner, Milwaukee, Wis.; James Coleman, C. J. L. Meyer, Fond du Lac, Wis.; A. E. Elmore, Fort Howard, Wis. The board elected the following officers: President, C. J. L. Meyer; Vice-President, J. H. Howe; Treasurer, M. L. Sykes, Jr.; Secretary, A. E. Elmore; Assistant Secretary, J. B. Redfield, Chicago; Executive Committee, C. J. L. Meyer, J. H. Howe and H. H. Porter.

—In addition to the meeting of stockholders which was held in St. Louis, June 16, and elected a board of directors, a meeting of the stockholders of the Laclede & Fort Scott Railroad Company was held, on a call from the President, in Nevada, Mo., June 16, and the following board of directors elected: J. N. B. Dodson, Vernon county, Mo.; B. F. Pollard, Cedar county, Mo.; I. W. Ross, Polk county, Mo.; G. W. O'Bannon, Dallas county, Mo.; H. Attwood, Laclede county, Mo.; F. C. Razier, St. Genevieve county, Mo.; H. T. Wilson, Fort Scott, Kan. The board elected Dr. J. N. B. Dodson, President; I. W. Ross, Vice-President; Joseph Shippin, of St. Louis, Secretary and Attorney.

—At a meeting of the Lake Shore & Michigan Southern board on the 2d, besides the choice of Cornelius Vanderbilt as director and President in place of Horace F. Clark, deceased, William H. Vanderbilt was chosen a director in place of William D. Bishop, who resigned, and was also chosen a member of the Executive Committee. Amasa Stone, Jr., of Cleveland, will be made Managing Director, it is said.

—Mr. G. W. Sharpless, late agent of the Burlington & Missouri River Railroad, at Villisca, Iowa, has accepted an appointment as Terminal Agent of the Atchison, Topeka & Santa Fe Railroad at Granada, Colorado.

—The officers and directors of the Union Pacific Railroad Company are now as follows: Vice-President and Acting President, John Duff; Treasurer and Secretary, E. H. Rollins; An

ditor, H. B. Wilbur; directors, John Duff, Elisha Atkins, Royal E Robbins, F. Gordon Dexter, Ezra H. Baker, Frederick Nickerson, Boston, Mass.; Oliver S. Chapman, Canton, Mass.; Oliver Ames, North Easton, Mass.; C. S. Bushnell, New Haven, Conn.; Augustus Schell, Sidney Dillon, Joseph Richardson, George S. Bowdoin, New York; Government directors, David S. Ruddock, New London, Conn.; J. S. C. Harrison, Indianapolis, Ind.; Hiram Price, Davenport, Ia.; James F. Wilson, Fairfield, Ia.; J. H. Willard, Omaha, Neb.

—Mr. E. L. Corthell, formerly Chief Engineer of the Sny Island Levee Works, has been appointed Chief Engineer of the Mississippi River Bridge Company, which is constructing the bridge over the Mississippi at Louisiana, Mo., for the Chicago & Alton.

—The Governor of Massachusetts has reappointed Mr. Charles Francis Adams, Jr., a member of the Board of Railroad Commissioners for another term.

TRAFFIC AND EARNINGS.

—The following is the official report of the earnings and expenses of the Union Pacific Railroad for the month of May:

	1873.	1872.	Increase.	P.C.
Earnings	$1,007,831 27	$890,442 07	$117,389 20	13¼
Expenses (including $100 970 for taxes)	490,322 23	471,715 11	19,607 12	4¼
Net earnings	$517,509 04	$419,726 96	$97,782 08	23¼

Earnings per mile, May, 1873, $977; 1872, $863.

For the five months ending May 31, the earnings and expenses were as follows:

	1873.	1872.	Increase.	Decrease.	P.C.
Earnings	$3,613,492 59	$3,006 157 94	$606,955 35	.....	20¼
Expenses	1 935,796 79	1,995 447 33	.....	$59,680 54	3
Net earn'gs.	$1,677,315 80	$1,010,679 91	$666 645 89	.....	66

For the five months the earnings per mile were: 1873, $3,511; 1872, $2,913; increase, $598, or 20¼ per cent.

—The earnings of the Kansas Pacific Railway for the third week in June were: passengers, $29,720.45; freight, $38,887.21; mails, $2,055.31; total, $70,662.97. Of this amount, $5,326.28 was for transportation of troops, mails and government freight.

—The earnings of the St. Louis & Southeastern Railway (consolidated) for the third week in June were: 1873, $32,857.04; 1872, $15,654.25; increase, $17,202.79, or 109¾ per cent.

—The earnings of the Great Western Railway of Canada for the week ending June 13 were: 1873, £25,830; 1872, £21,216; increase, £4,614, or 21¾ per cent.

—The earnings of the Grand Trunk Railway of Canada for the week ending June 14 were: 1873, £37,800; 1872, £35,100; increase, £2,700, or 7¾ per cent.

—The following companies have so far reported earnings for June:

	1873.	1872.	Inc.	Dec.	P. c.
Atlantic & Gt. Western	$423.424	$435.511	.....	$12,087	2¾
Bu., Cedar Rap. & Minn.	96 696	74 242	$22.454	.....	30¼
Chicago & Alton	482,005	435.192	46,813	.....	10¾
Chicago & Northwestern	1,292,143	1.070,460	221,683	.....	20¾
Central Pacific	1 314,790	1,138 272	175,518	.....	15½
Erie	1,717.593	1,607.492	110,1•1	.....	6⅞
Illinois Central	724,983	659,363	65.620	.....	9¾
Ind., Bloom. & We-tern	136.178	100,868	35,310	.....	35
L Shore & Mich. South	1,585.368	1,311 010	274.3•8	.....	20⅞
Marietta & Cincinnati	185 953	158.425	27,.24	.....	17⅝
Milwaukee & St. Paul	925,210	594.769	330 441	.....	55½
Ohio & Mississippi	282 302	262.326	19,976	.....	7⅝
St L., Kan. City & North.	199.958	213,764	.....	13,806	6½
Tol., Waba h & Western	541,191	462,868	78.323	.....	16⅞

—The earnings of the Erie Railway for the eight months ending June 30 were: 1873, $12.272,996; 1872, $11,894,717; increase, $378,279, or 3 3-16 per cent.

—The earnings of the Central Pacific Railroad for the month of June were: 1873, $1 313,790; 1872, $1,138.272; 1871, $795,176; increase, 1873 over 1872, $175,518, or 15¾ per cent.; increase 1873 over 1871, $518.614, or 65¼ per cent. For the six months ending June 30 the earnings were: 1873, $6,320.787; 1872, $5,508.616; 1871, $4,044,882: increase, 1873 over 1872, $812,171, or 14¾ per cent.; increase, 1873 over 1871, $2,275,905, or 55¼ per cent.

—The earnings of the Columbus & Hocking Valley Railroad for the month of June were: 1873, $75,510; 1872, $62,001; increase, $13,509, or 21¾ per cent. The coal tonnage for the month was: 1873, 53,712; 1872, 39,663; increase, 14,049 tons, or 35¾ per cent.

—The earnings of the Great Western Railway of Canada for the week ending June 20, were: 1873, £25,742; 1872, £21,044; increase, £4,698, or 22¾ per cent.

—The earnings of the Grand Trunk Railway of Canada for the week ending June 21, were: 1873, £36,200; 1872, £34,800; increase, £1,400, or 4 per cent.

CHICAGO RAILROAD NEWS.

Illinois Central.

This company reports as follows its receipts for June:

Land Department.

Acres construction land sold	1,157.14 for	$9,578 74
Acres free lands sold	102 66 for	1,041 26
Total sales during the month of June, 1873	1,259.80 for	$10,6 0 00
To which and town lot sales		65 00
Total of all	1,259 80 for	$10 685 00
Cash collected in June, 1873		$46,777 28

Estimated Earnings—Transportation Department.

	In Illinois. 707 Miles.	In Iowa. 402 Miles.	Total. 1.109 Miles.
Freight	$377,567 03	$-2 889 00	$460 456.00
Passengers	113.287.05	40. 84 85	153.671 90
Mails	6,375 0	3,059.33	9,434.33
Other sources	98,915.00	2,505.67	101,420.67
Total, June, 1873	$596 144.05	$128.83• 85	$724 982 90
Total actual earnings, June, '72	543,792.15	115,570.82	659,362.97
Increase	$52,351.90	$13,268.03	$65,619.93

This is an increase of 9¾ per cent. in the Illinois earnings, 11½ per cent. in the Iowa earnings and 9¾ per cent. in the total earnings.

This is the most favorable report the company has made in a long time, though it must be remembered that it has the poorest year in its late history to compare with. The stock of the road has been very unfavorably affected recently, and to an absurd extent, it seems to us, considering the value of that part of the property which cannot fail to grow in traffic and profit.

Working of the New Tariffs.

One week has passed since the new freight and passenger schedules of tariffs went into effect—not time enough to give a clear idea of how they are to work in practice, further than that Chicago is to be affected detrimentally. The greater share of all the business done heretofore between Chicago and towns in Illinois on east and west lines will hereafter be done at Cincinnati or St. Louis.

The interpretation of the law made by the Railroad Commissioners tends to overturn the ideas of the railroad men to some extent, since it demands the application of the law to freights outside of the State in certain cases. The tendency of the law is to take from Chicago almost the entire business transacted with Kansas City, Atchison, Leavenworth, and cities similarly situated, and to give it to St. Louis.

The effect of the law will be that the railroad lines running south, while bringing to the city heavily-loaded trains, transporting grain, must return their cars to a very large extent empty.

Chicago, Om ha & St. Joseph.

A meeting of the stockholders was held at Cedar Rapids this week, in order to make some arrangement for the continuance of the work on this road. It is said that the auspices are f vorable for the negotiation of the bonds and the construction of the road within a short period of time.

ANNUAL REPORTS.

Erie.

The following report was presented at the annual meeting of stockholders held in New York, July 8:

"*To the Stockholders of the Erie Railway Company:*

"The general law of the State requires that a report shall be annually made for the year ending September 30, but the recent change in the time for the holding of the elections of this company from October to July, would seem to make it proper that a partial report of the operations of this company to this time should now be presented; but this report is from necessity far from complete, even for the current six months, as the returns are not yet all in for the month of May last. In the course of the next few weeks a complete report of all operations to the first of July can be made, and it is intended that such a report shall be then made as will show with precision the actual condition of this company's affairs for the past six months.

"The earnings of this company have continued steadily to increase. For the past half year they have largely exceeded those of any similar period since the completion of the road. The reforms begun in the management of the company's business have diminished the relative expenses in almost every department, and these expenses will be still more largely diminished as the reforms in progress are developed; and when the present plans for a double track and narrow gauge upon the whole line shall be carried into effect, there is no reason why the cost of operating this road, in comparison with its gross earnings, should not be as low as upon any of the other great trunk lines.

"We are rapidly increasing our facilities for business. We have put in this season, already, twenty miles of sidings, and laid ten miles of second track, and we have increased our coal, postal and other cars. We are preparing to reduce the heaviest grades upon the line; and, when this is done, taken in connection with the cheapness of fuel—in respect of which the Erie Company possesses very decided advantages over any of its rivals for business in this State—this company will be able to overcome the disadvantages under which it has suffered in the past, in comparison with other lines originally possessing better gradients or greater control of local traffic. These advantages, now beginning to be realized, will increase in the future; and the day is not far distant when our proximity to and connection with the anthracite and bituminous coal fields of Pennsylvania and Ohio will far more than counterbalance the advantages heretofore possessed by other lines.

"The funded debt of the road has been increased during the year by the addition of ten millions of convertible bonds, of which eight millions have already been sold at par, in currency. The remaining two millions will probably be placed at the same rate as soon as they will be needed for our new construction and equipment, now in progress. Assuming all these bonds to be negotiated, the funded debt of the company will then be as follows:

Reported July 1, 1872	$30.040,140 00
Convertible bonds	10,000,000 00
Total	$40,040,140 00

"The stock capital of the company is unchanged, as reported July, 1872, viz.:

Common stock	$78,000,000 00
Preferred stock	8.536,910 00
Total	$86,536,910 00

The floating debt of the company, as reported July 1, 1872, was	$6,463,663 20
The present floating debt is nearly	1,700,060 00

or about equivalent to one month's current receipts, showing a reduction since last July of $1,750,000 and upward.

"The grading for the double track is rapidly progressing. Upward of 40 miles will be ready for the rails in August, and during the autumn a further portion of 80 miles will be completed, making in all 120 miles to be constructed this season.

"During the present season, we expect to change the existing gauge of the road from Attica to Painted Post, a distance of 100 miles, and to lay a third rail from Attica to Buffalo, and from Painted Post to Waverly, the third rail on the latter being already nearly complete. This will give us a narrow-gauge connection with Philadelphia and the anthracite coal fields. As rapidly as is consistent with the economical change of our present motive power and rolling stock, it is proposed to narrow the gauge of the whole of the main line and branches.

"Not only is this change demanded for the purpose of reducing working expenses, but because we cannot, so long as our gauge is not in conformity with that of our Western, Eastern and Southern connections, secure a large amount of traffic now offered to us, if we could receive and transport it without breaking bulk. The motive power and rolling stock of the company is in a more efficient condition than at any previous period, as is shown by the increased service which it performs. But the imperative demands of our traffic will require, by the time the narrow-gauge track is extended eastward to Waverly, the immediate adultion of 2,000 narrow-gauge cars, and 100 narrow-gauge locomotives, which we are now about to put under contract.

"In the month of February last, in addition to the annual dividend of 7 per cent. on the preferred stock, a further dividend of 1¾ per cent. on the common stock was declared and afterward paid.

"The accounts, based upon which this dividend was declared, have already been published, and have, in addition, been most carefully scrutinized by a committee of the Legislature. At the time of making this dividend, sundry important items of account had to be estimated, because of the incompleteness of the returns and the backwardness of the bookkeeping, but in every instance, when these estimated items came to be corrected by the actual returns and the completion of the accounts, it was found we had under-estimated the receipts, over-estimated expenses, and therefore under-estimated the actual net earnings, and nothing has since occurred to show, or even raise a doubt, that this dividend was not fully earned, or was not properly declared and paid. On the contrary, it is believed that the system then inaugurated, of carrying the cost, paid from the earnings of all additions to the property and equipment of the road to capital account, taking care in all cases to make ample allowance for the necessary expenditures for a full and liberal reparation of the road, its equipment and machinery in every department, and of then dividing the whole of the actual net earnings of the company among its stockholders for the time being, is a policy equally honest and wise, and to this policy of fairly dividing the actual earnings at short intervals, say semi-annually, among the whole body of stockholders, the present board is fully committed upon principle.

"As before stated, a full report of all the affairs of the company, including its earnings for the first six months of the present calendar year, is necessarily deferred to about the end of August next. All of which is respectfully submitted. By order of the board.

"PETER H. WATSON, President."

Ashtabula, Youngstown & Pittsburgh.

The annual report of the President, at the recent annual meeting, contains the following:

"Since the last annual meeting, your board have to report the completion of your line of road from Youngstown to Lake Erie, with a large portion of the docks finished in the best manner, for the reception of ore, coal, &c. The first regular through train passed over it on the first day of May, and since that time the trains have run regularly through from the south to the city of Ashtabula, and are now ready to go to the harbor. But for the horse disease last fall, which greatly retarded the work, and also a troublesome litigation at Youngstown, the road might have been running since last January. The contractors, through their able Chief Engineer, F. Slataper, Esq., and with abundant means at their disposal, have pushed the work rapidly forward, and in a manner highly satisfactory to your board. Neither the unprecedented high price of iron, and scarcity and consequent high price of labor, together with the stringency in the money markets of this country and Europe, appeared to delay the work in the least and, when other expenditures, beyond the ability of our company to meet, became necessary, they were always willing to meet any necessity of our company by promptly ordering the work done or property bought, and as promptly paying for the same, until such a time as the company can reimburse them. But for this, the expense of dredging Ashtabula harbor and preparing it for business the present season, could not have been done, as the government signally failed to carry out their promise to us.

"The settlement of the difficulties at Youngstown has resulted in a loss to our company of some $20,000 more or less. The high prices exacted in places for depot grounds, etc., and the inability of the company to collect from its subscribers the full amount promised and some other extraordinary expenses, which cannot be fully estimated until the contract with the Granite Improvement Company is terminated and the accounts settled, will have to be provided for by our company. As an offset to this, we have sold an undivided third of the Youngstown depot grounds to the Lawrence Railroad Company, for $30,000, which will, to that extent, go to pay this debt.

"Much remains yet to be done to fully develop the business of your road. Branches must be built to coal and iron works; trade must, to some extent, be diverted from the old channels, and new trade created, all of which will require time and patience on the part of the stockholders. In the hands of the Pennsylvania Company, with their thorough organization and long experience, together with the strict integrity and fair dealing which has always characterized that company, your board believe that success is certain. It must not, however, be forgotten that the Mahoning valley has strong competing lines, and too many of them, and some of them with local advantages and influence which must seriously divide the trade with us."

Missouri, Kansas & Texas.

This company at the date of its report owned a line from Sedalia, Mo. (on the Missouri Pacific, 189 miles west of St. Louis), southwest to Parsons, Kan., and thence south through the Indian Territory to Denison, Tex., 432½ miles; a line from Parsons northwest to Junction City, Kan., 156½ miles, and a line from Holden, Mo., west to Paola, Kan., 54 miles, making in all 643 miles. The Texas line was not completed until December 24, 1872. The average mileage for the year covered by the report was about 486 miles.

Since the close of the report, an extension 53 miles long from Sedalia northeast to Moberly has been completed, and the company has secured control of the Hannibal & Central Missouri road from Moberly to Hannibal, 70 miles, increasing its mileage to 766 miles. Work has also been commenced on an extension from Denison, Tex., southwestward. The main southern connection of the road, the Houston & Texas Central, was not completed until March, 1873, so that connection was not made through to Galveston until just at the close of the report.

The earnings and expenses of the road for the year ending March 31, 1873 were as follows:

Earnings:	
Passengers	$638,027
Freight	1,552.541
Mail	58 660
Express	31,300
Miscellaneous	37,040
Total ($3,955 per mile)	$2,3.7,568
Expenses for:	
Maintenance of way	$320.196
Machinery and rolling stock	178,1:8
Extraordinary repairs and renewals	67,435
Train expenses	302 129
Station expenses	121 124
Claims and damages	132,701
General expenses	153,491
Legal expenses	11.0:5
Salaries	73,614
Mileage and car service	17.0:4
Total expenses (59.41 per cent.)	$1 376 9.7
Net earnings ($1,638 per mile)	$940,661

The increase in gross earnings over the previous year was 108¼ per cent. It is hardly possible to make comparisons, however, owing to the unfinished condition of the road.

During the year 152,148 passengers and 248,222 tons of freight were carried, equal to 13,541,176 passengers and 34.512,497 tons of freight carried one mile. The principal items of freight were 15.194 bales cotton, 62,836 dry and 8,729 green hides, and 153,203 pounds wool. Passenger trains ran 456,193 miles, freight trains 600,958 miles, and all other trains 238,340 miles, making a total train mileage of 1,295,491 miles.

The equipment of the road consists of 50 locomotives, 24 first-class and 11 second-class passenger cars, 1 director's, 1 paymaster's, and 22 baggage cars, making a total of 59 passenger train cars, 297 box, 342 stock, 290 flat, 56 coal, 16 caboose, 1 magazine, 6 boarding and 20 dump cars. There are under contract 20 locomotives, 8 passenger and 5 postal cars.

During the year a contract has been made with the Atlantic & Pacific Company for pooling the Texas and Vinita business, and with the Missouri Pacific, the latter contract securing terminal facilities in St. Louis which enable the company to control its own business there.

Coal is found along the line of good quality and in sufficient quantity to supply all the needs of the road. It is now worked at several points in Kansas and at McAllister Station, in the Indian Territory.

The land grant amounts to 4,465,142 acres. Of this there had been sold up to the date of the report 271,271 acres for $1,709,572, an average price of $6.30 per acre.

The capital stock of the company is $16,945,000 and the fund-

ed debt amounts in all to $16,596,000, making the total fixed capital account $33,541,000, or about $48,191 per mile.

Northern, of New Hampshire.

This company's road extends from Concord, N. H., northwest to White River Junction, 69 miles, with a branch from Franklin north to Bristol, 13½ miles, making 82½ miles in all.

The operations for the year ending March 31, 1873, were as follows:

Earnings:	
From passengers	$328.045 39
From merchandise	457 244 35
From mails	11,160 00
From rents	2.400 75
From express	7,500 00
From miscellaneous	4 75
Total	$706,355 24
Expenses:	
Passenger department	$35.504 12
Merchandise department	53.873 54
Locomotive department	174.941 57
Maintenance of way	116 275 71
Miscellaneous expenses	39.501 76
General expenses	18,572 00
State tax	50,583 83
Total	$489.252 53
Balance of earnings	$214,102 71
Less new rail account	56,038 01
Net earnings	$161.064 70
Add balance of income per last report	146 660 96
Total income	$307,725 66
From which deduct—	
Balance of interest and United States internal revenue accounts	$11 298 92
Dividend December 1, 1872 $4 per share	119,924 00
Dividend June 1, 1873, $4 per share	119,924 00
	251,146 92
Balance of income account	$56,578 74

The unusually severe weather and great fall of snow during the past winter have been unfavorable to the road in increasing the expenses of operation and diminishing the business.

As compared with the previous year there is a decrease of $16,389.41, or 2¼ per cent. in gross earnings; an increase of $24,967.24, or 5¾ per cent. in expenses; and a decrease of $26,676.65, or 14½ per cent. in net earnings. The expenses (including new rail account) were 77¼ per cent. of the gross earnings, which were at the rate of $8 562 per mile. During the year 195,406 passengers and 411,888 tons of freight were carried, equivalent to 8,060,748 passengers and 25,057,849 tons of freight carried one mile. The contingent fund has been increased to $97,997.

During the year passenger trains ran 181,179 miles, freight 319,098, and other trains 6,571, making the total mileage 506,848. One new locomotive, one passenger and four freight cars were added to the equipment, and 20 freight cars built to replace old ones. The equipment now consists of 11 passenger and 16 freight locomotives, 412 long and 108 short merchandise cars, 16 passenger, 6 baggage and 20 gravel cars.

During the year 1,518 tons of new rails and 48,863 new sleepers have been placed on the track; and 2,465 tons of rails have been taken up, repaired and relaid. The report says:

"The contracts referred to in the annual reports for 1872 relative to a line for western business, have been attended with large charges against this company during the past year, arising from the operations of preceding years in connection with last year. It is not expected that so large charges will be incurred in future; and modifications of those contracts have been suggested, which if effected, will render them more favorable in that respect. Under the circumstances, we have deemed it proper to provide for those charges from other sources, instead of taking them from the income of the past year."

The Sugar River Railroad has been constructed to its junction with the Sullivan County Railroad in Claremont, as intended and it has been in operation to that place since last September.

The capital stock is now $3,068,400 and the bonded debt $102,100, making the total fixed capital account $3,170,500, or $38,430 per mile.

St. Louis, Alton & Terre Haute.

The main line of road owned by this company is 195 miles long, extending from East St. Louis, Ill., to Terre Haute, Ind., and is leased to the Indianapolis & St. Louis Company. The following report is made for the year 1872:

Gross earnings ($7,284 per mile)	$1,420 551 59
Expenses (68 4 per cent.)	976,631 24
Net earnings ($2,277 per mile)	$443 920 35
Rental paid to lessors	450,000 00
Loss to lessees	$6 079 65

The gross earnings for the year show an increase of $41,908, or 3 per cent.

The company itself operates its Belleville Branch from East St. Louis to Belleville, 15 miles, and the Belleville & Southern Illinois road (leased for 40 per cent. of gross earnings) from Belleville to Du Quoin, 56 miles, together forming a line 71 miles long from East St. Louis southeast to Du Quoin on the Illinois Central.

The operations of this line for the year are stated as follows:

Gross receipts ($7,141 per mile)	$507,019 17
Operating expenses (32.86 per cent.)	268,004 50
Net earnings ($3,366 per mile)	$239.014 67

The increase in gross earnings over the previous year was $16,230.69, or 3 5-16 per cent., and in net earnings, $22,048.86, or 10¼ per cent. During the year $19,013.09 was expended for permanent improvements and charged to construction account.

THE SCRAP HEAP.

Prices of Rails in June.

Bigelow & Johnston report prices of iron rails at $65 to $68 gold for foreign, and $76 to $80 currency for American during the month of June; for steel rails $108 to $112 gold for foreign and $120 to $125 currency for American. Old rails were $51 to $52 currency for double heads, and $49 to $50 for T, these latter prices, however, being nominal, as scarcely any transactions have occurred.

The imports at New York for June were 4,568 tons of iron and 7,635 tons of steel. The imports for the six months ending with June were 38.817 tons of iron and 42,517 of steel—a total of 81.334 tons of rails, against 88,491 tons imported at the same port for the same period in 1872 and 96,971 tons in 1871. The decrease in total imports is much greater than would appear from this statement, as the falling off in imports *via* New Orleans for new Western roads must be immense.

Bigelow & Johnston say concerning the trade in new rails:

"With the exception of a sale of about 1,500 tons for New Orleans delivery, on private terms, there has been little or no change in the position of our market for foreign rails. Prices are if anything rather weaker, and some holders evince considerable anxiety to realize. Of American rails a few thousand tons were reported as sold on private terms, but apart from this the trade remains inanimate. We close the month with some little improvement in the inquiry, though there is a marked absence of *cash* buyers."

OLD AND NEW ROADS.

Mississippi River Bridge.

Work on the bridge over the Mississippi at Louisiana, Mo., was commenced July 4. A large amount of material has already been placed on the ground by Messrs. Reynolds & Saulspaugh, of Rock Island, Ill., who have the contract for the substructure and approaches. The iron work, which is to be furnished by the Kellogg Bridge Company of Buffalo, and the Keystone Bridge Company of Pittsburgh, is well under way. The company intends to have the bridge completed by next December.

Central of Iowa.

This company has issued a circular to the bondholders respecting the non-payment of interest. The circular states that the earnings of last year were less than the cost of operating, and that the floating debt is now about $950,000, of which more than half, or $524,000, is for money advanced to pay interest. The interest due in April on the second-mortage bonds was passed, and that due on the first-mortgage bonds in July cannot be paid. The road cannot be properly worked without a large increase of equipment, and 36 miles of it is practically useless without the construction of 31 miles of new line. In order to obtain means for equipping and completing the line, the bond-holders are asked to deposit their coupons for the next two years' interest with the Farmers' Loan and Trust Company in New York, and to receive for those coupons scrip bearing 7 per cent. interest in gold and running till January 1, 1874. When the interest is thus funded the company proposes to issue preferred stock to take up the floating debt and obtain the money required for equipment, iron, etc. A large amount of conditional subscriptions has already been obtained and provisional contracts for five locomotives made.

The amount of the first mortgage bonds is $3,700,000, and the second mortgage, $925,000.

Missouri Pacific.

The Common Council of St. Louis has declared the track of this company on Poplar street and the levee in that city a nuisance and has ordered it taken up at once. There is, however, a suit pending in the courts with regard to this track which will shortly be decided.

The track in question extends from the depot of the road in Seventh street, down Poplar street to the levee and for some distance along the levee and is used for cars and freight to boats and to other railroads. It was built some years ago under authority of a city ordinance. This ordinance expired by limitation, January 1, 1872, and the City Council having refused to extend it, the track was taken up. Subsequently, however, the companies claimed the right to use it without permission from the city, and it was laid down again and has been used ever since. The suit by the city to compel the company to take it up was begun some time since. The Merchants' Exchange has formally protested against any interference with the track.

North Shore of Canada.

It is now reported that this company has negotiated a loan of £3,000,000 (probably a misprint, as the contract price for the road is only $7,000,000), in London, which, with the $1,000,000 subscribed by the city of Quebec, will probably enable it to complete its road, the route of which is up the north bank of the St. Lawrence, from Quebec to Montreal. The Chief Engineer is Gen. Silas Seymour, and the contractors are the "Chicago Contracting Company," which consists of Samuel Keith, Perry H. Smith and George L. Dunlap, of Chicago. The main line of the road will be 160 miles long, and it is to have a branch from Three Rivers up the St. Lawrence, 30 miles, to Grand Piles.

Erie.

Mr. O. Chanute, Chief Engineer of this road, will receive proposals until noon of July 21 for the grading and masonry for a second track on the following sections of the road:

On the Delaware Division from Narrowsburg, 121½ miles from New York, westward 31 miles to Lordsville, N. Y.; on the Susquehanna Division from Erwin's, 295¾ miles from New York, westward 10½ miles to Rathboneville; and from Somebody's, 11¾ miles west of Rathboneville, west, 9 miles to Canisteo; on the Buffalo Division from Hornellsville, 4 miles west of Canisteo, west 8 miles to Burns. The work is divided into sections of about one mile each, and bids may be made for one or more of these. Blanks for proposals and specifications may be had of the following resident engineers: R. W. Ware, Hancock; W. B. Coffin, Elmira; W. F. Merrill, Buffalo. The work is to be completed within 90 days from the time of awarding the contracts.

The Vermont Central Investigation.

The Committee of the Vermont Legislature, which was appointed to investigate the affairs of the Vermont Central Railroad, has completed an elaborate report, of which the following is a summary:

"Those who receive legislative retainers are exonerated of corrupt intent, but those who paid them did so chiefly to gain influence in creating and maintaining public sentiment. The car companies were organized by the officers and their immediate friends, and were profitable, but did not defraud the trust, and were of advantage to the public. The policy of such organizations is, however, questioned. The foundry contract yielded a royalty of $135,000 to W. C. Smith, which was proper before he became a trustee; since then they leave the courts to determine. They do not feel sure that the prices of castings were not too high, but do not find affirmatively. They find a secret service fund set apart and controlled by Gov. Smith, which they do not consider necessary. It was in some instances misapplied, and a large portion was unaccounted for owing to Gov. Smith's refusal to testify in regard to it. They cannot find whether it was or was not correctly used. They do not go into the subject of private frauds in the trust, but leave it to the courts. The Sullivan road has been run for the benefit of Gov. Smith and his associates, and has netted them upward of $150,000, but it has not been run to the prejudice of the Vermont Central. Messrs. Smith and Clark received nearly $397,000 from the Montreal & Vermont Junction road. The Committee requested the books, but they were not brought from Canada, so they could not ascertain as to the alleged frauds in the construction account. Since the lease to the Central road, the road has been operated honestly under it. If there was any impropriety it is referred to the courts. W. C. Brown was paid $25,000 as a retainer on which they had no testimony but that of Gov. Smith. They find that it was an unnecessary and extravagant fee, but do not find that it was a bribe. They recommend that the whole system of passes be abolished as one against public policy, and tending to an undue political influence, and the creation of a privileged class. The censure of the judiciary heard outside of the State is accounted for on the ground of the unfortunate relation so long sustained by the court to the roads. The general impolicy of continuing a cause indefinitely in court when it involves important business operations is condemned."

Hudson River Bridge.

Books for subscriptions to the stock of the company which purposes to construct a bridge over the Hudson at Poughkeepsie were opened at Poughkeepsie recently. It is reported that the subscriptions made amount nearly to $1,200,000, the limit being $2,000,000. Of the shares subscribed, $100 each, 5,500 were taken by A. L. Dennis, President of the United New Jersey Railroad & Canal Company, and 5,500 by J. Edgar Thomson, President of the Pennsylvania Railroad Company. Ten per cent. was paid at the time of making the subscription. Upon this residents of Poughkeepsie make subscriptions in smaller amounts, some of them 50 and 100 shares.

Hon. Horatio Allen has addressed the following to John F. Winslow, President of the Bridge Company:

"I am informed that the width of the river at the proposed place of crossing will require a bridge of 3,400 feet in length, that the depth of water may be taken at 50 to 55 feet, and that rock or other material suitable for the foundation of the towers will be found at 70 feet below the surface of the water. I am directed to assume that suitable provision for the navigation of the river will be made by an elevation of the under side of bridge above the water of 130 feet, and by two center spans of 1,100 feet, and half spans of 600 feet. The width of the bridge to be that which will provide for a single track, and for the horizontal stability of the structure. The towers of the bridge to be of masonry, sustained by adequate foundations; the cables to be steel or iron as found preferable, and the superstructure of iron as far as advisable. The carrying capacity of the bridge to be that of half a ton to the lineal foot. The bill allows the construction of four piers in the river."

New York & Oswego Midland.

The last rail on the main line of this road, completing the route from Oswego to New York, was to be fastened down on the afternoon of the 9th.

Central Pacific.

The proposed sale of C. R. Huntington's interest is reported to have failed, and Huntington was re-elected a director on the 9th.

Elizabethtown & Paducah.

A correspondent informs us that this company has placed under contract the whole of the Louisville Extension, from Cecilia Station (six miles west of Elizabethtown, Ky.), northward to Louisville, a distance of 45.7 miles, on a line very near to the Louisville & Nashville line. The contracts call for the completion of the work by December 1, 1873, which will enable the company to have it in operation by January, 1874. The company will then have, in connection with the Paducah & Memphis (when completed), a line from Louisville to Memphis, Tenn., less than 10 miles longer than the present line of the Louisville & Nashville Company, and, it is claimed, with easier grades. The city of Louisville, it will be remembered, voted $1,000,000 in aid of this extension some time ago.

The contracts for the construction of the iron draw-bridge over Salt River and the two iron viaducts at Muldraugh's Hill were let to the Baltimore Bridge Company. The draw span of the Salt River Bridge will be 300 feet long and one of the viaducts will be 80 and the other 130 feet high.

Central Vermont.

A statement made by a New York daily paper, to the effect that this company had passed under the control of the Erie Railway Company, has called forth a very emphatic letter of denial from the President, ex-Governor J. Gregory Smith.

The company has now taken possession of and is operating as receiver, under the direction of the court, all the roads formerly worked by the Vermont Central trustees, except the Sullivan Railroad (from Windsor to Bellows' Falls), the Montreal & Vermont Junction (from St. John's, Quebec, to the Vermont line) and the New London Northern road, which were specially excepted from the order of the court.

Danville, Tuscola & Western.

A correspondent informs us that the grading on this road is completed from Tuscola, Ill., to Dallas, the point of intersection with the Tuscola, Charleston & Vincennes. Mr. J. B. Brown, of Chicago, is contractor for the construction of both roads.

Tuscola, Charleston & Vincennes.

The grading of this road is nearly completed from Dallas, Ill. (the intersection with the Danville, Tuscola & Western), to the junction with the Paris & Danville road. On the southern end of the road, several miles from Charleston, Ill., northward are completed and ready for the iron.

Pennsylvania.

It is reported that this company will soon put upon its road a general mortgage of $100,000,000 on which sufficient bonds will be issued to cover all the present debts of the company, of every description, and provide such additional means as may be needed for the improvement of the property.

The company, however, is only authorized by the Legislature to issue bonds to the amount of its capital stock, which is now $72,000,000.

Boston, Clinton & Fitchburg.

This company has established a freight line from Lowell, Mass., and Fitchburg to New York, running over the company's lines to New Bedford and thence to New York by steamer. Two large propellers have been built for the line from New Bedford to New York.

The extension of the New Bedford road from its old terminus in that city to tide-water was celebrated June 30, by an excursion.

Canada Pacific.

At a meeting of the directors in Montreal, July 5, the terms proposed by Sir Hugh Allan for the construction of the road were finally accepted.

There is much excitement in Canada over rumors of extensive corruption and bribery which, it is said, were used to obtain the charter of the company.

Northern Pacific—Pacific Division.

Track-laying on the extension from Tenino, Wash. T., northward has commenced.

There is considerable excitement among the towns on Puget Sound as to the terminus of the road. The town of Seattle has offered a large amount of land and $1,000,000 in subscriptions, and Tacoma and other towns have made large offers. The question will probably not be determined for some time.

Meeting of General Superintendents in St. Louis.

A meeting of General Superintendents was held in St. Louis, July 2, for the purpose of making some agreement on the commission system between the other companies and the Rockford, Rock Island & St. Louis, which withdrew some time ago from the agreement made in November, 1871. The meeting was private, but it is understood that a satisfactory arrangement was made.

The Minnesota Railroad Law.

In the United States Circuit Court at St. Paul, Minn., recently, Mr. Charles McIlrath, Receiver of the Southern Minnesota Railroad, made application to the Court for directions as to whether he should conform to the law (recently sustained by the Minnsota Supreme Court) and Mr. J. C. Easton applied for leave to sue the Receiver for overcharge made on freights carried over the road since 1871. In the case of Mr. Easton, leave was granted to bring suit against the Receiver. On the application of the Receiver the Court declined to order the Receiver to violate the State law, but also declined to make any positive order requiring to him obey it, leaving the regulation of the rates to his discretion, with the advice of the trustees for the bondholders. This decision was made on the ground that it was an open question whether the law did not violate rights secured to the companies under the Constitution of the United States, but the Court did not wish to make any further order until the point came directly before it in the case of Easton

against the Receiver. Meanwhile the receipts of the road would be paid into Court and overcharges could readily be recovered by suit, should the law finally be decided to be constitutional.

It is probable that this question will be finally settled by litigation before the United States courts.

Pennsylvania Air Line.

It is said that a lively competition between the new and old lines will be the result of the opening of the new route from New York to Washington. It has been stated that the present contract for the running of the trains over the old line expires August 1, and that after that time the Pennsylvania Railroad Company will refuse to sell through tickets or check baggage to Washington over the Philadelphia, Wilmington & Baltimore road.

Northern Central.

It is announced that the trains of this road will hereafter run to Rochester, N. Y., running from Canandaigua to Rochester over the Auburn Branch of the New York Central & Hudson River.

Springfield & Illinois Southeastern.

The Shawneetown (Ill.) *Mercury* says:

"The Springfield & Illinois Southeastern and St. Louis & Southeastern railways have entered into an arrangement by which they will both use the same track from Cypress Junction to the Ohio River; also the same round-house and turn-table. The track of the Springfield road where it leaves the old grade coming to this city will be taken up, together with the Y."

Middlesex.

The last rail of this road, which extends from Lexington, Mass., west to Concord, about six miles, was laid June 28, and the line will shortly be opened for business. It forms an extension to Concord of the Lexington Branch of the Boston & Lowell road, and will be worked by the Boston & Lowell Company.

Maine Central.

The passenger cars of this road are now being fitted with the Miller platform and the Westinghouse brake.

New Mail Route.

An extension of the mail service on the Cleveland, Mount Vernon & Delaware Railroad over the new part of the road from Mount Vernon, Ohio, to Columbus, 45 miles, has been ordered. The annual compensation has been fixed at $2,486.

International & Great Northern.

The track of the Great Northern Division is laid to Mineola, Texas, the crossing of the Texas & Pacific, three miles north of the late terminus at the Sabine River. It is understood that this will be the terminus of the road, at least for the present season.

Washington City, Virginia Midland & Great Southern.

This company recently made a proposition to lease to the Baltimore & Ohio that portion of the Manassas Branch from Strasburg, Va., to Harrisonburg. The proposition was accepted by the directors of the Baltimore & Ohio at their monthly meeting held last week in Baltimore. The lease is to be permanent and the rental agreed upon is $89,250 (in gold) annually. The portion of the road leased is 51 miles long and will form a part of the Baltimore & Ohio Company's line up the Shenandoah Valley. The Baltimore & Ohio already owns a branch line running up the valley from Harper's Ferry to Strasburg. This lease will give the Baltimore & Ohio complete control of the whole line. The rental paid is 7 per cent. interest on a valuation of $25,000 per mile.

At the same meeting the directors of the Baltimore & Ohio also resolved to advance from time to time, as might be needed, in money and credits, the amount of $700,000 to the Washington City, Virginia Midland & Great Southern Company, said amount to be used for the completion of the extension from Lynchburg to Danville.

Bibles in Coaches.

We noticed recently that Bibles had been placed in the coaches of the Toledo, Wabash & Western Railway, for the use of passengers disposed to read them. We hear now that the plan was introduced in 1870, by Rev. E. H. Pierce, the agent of the American Bible Society for Western Kentucky, who placed them in the Louisville & Nashville cars. Since that time Bibles have been placed in the cars of the East Tennessee, Virginia & Georgia, the Western & Atlantic, the Cleveland & Pittsburgh, the Cleveland, Columbus, Cincinnati & Indianapolis, the Lake Shore & Michigan Southern, and the Toledo, Wabash & Western roads. Usually two volumes are placed in a rack on each side of the car, one volume containing the Gospels and Acts, and the other the Epistles and Psalms.

Experiments with Boilers.

General D. D. Smith, Supervising Inspector General of Steamboats, has this week been making arrangements for the experiments with boilers which are to be made at Sandy Hook this summer. The Pennsylvania Railroad Company has given five or six boilers for use in the experiments, and work is begun on the arrangements and structures necessary. A similar series of experiments is to be made in Pittsburgh.

Bonds Voted under the "Boesel Law."

The Columbus (O.) *State Journal* gives a partial list of the bonds voted in that State in aid of railroads under the Boesel law, which has lately been declared unconstitutional.

In Pike County, Pee Pee township voted $40,000, and Jackson township $25,000 for the Scioto Valley Railroad, and Perry $16,500 for the Ohio & Kentucky Railroad.

In Sandusky County, Green Creek voted $40,000 and York township $40,000.

In Meigs County, Salisbury township voted $174,000; Sutton township, $58,000; Scipio township, $15,000; Columbia township, $15,000.

In Union County, Paris township voted $65,000 for Columbus & Toledo—no bonds issued.

Franklin County voted $200,000 to the Columbus & Ferrara, and $300,000 to the Columbus & Toledo road.

In Huron County, Norwalk voted $110,000 and New London $50,000 in aid of Wheeling & Lake Erie road, and Ridgefield $40,000 to New York & Chicago Air Line.

The above bonds were voted but had not yet been deposited with the State Treasurer. The total amount of bonds voted under the law, and deposited in the State treasury July 1, was $5,965,944, and, in addition to this, $143,700 had been previously deposited in the treasury, but subsequently withdrawn to be negotiated.

Rafting Logs on Lake Michigan.

About two weeks ago the tug John A. Dix arrived at Chicago from Ludington, Mich., with a raft of logs which it had towed the distance of 160 miles in 63 hours, the weather being fine all the time. There were 861 logs in the raft, in 49 sections of from 15 to 20 each, each section being fastened together by a chain passed through eye-bolts screwed into each log. It is said that the cost was but $500, against $2,000 for a similar quantity of lumber in vessels. Most of the logs were for square timber and piles.

New Orleans, Mobile & Texas.

The trustees of the second-mortgage bonds, who purchased the road at the recent sale, advertise that they will hereafter conduct the business on the road between New Orleans and Mobile under the name of the New Orleans & Mobile Railroad Company, and that of the road west of the Mississippi under the title of the New Orleans & Texas Railroad Company. With regard to the extension of the latter line westward they state nothing definite, but say that the immediate resumption and vigorous prosecution of the work depend in some measure on the communities directly interested.

Green Bay & Lake Pepin.

The surveyors have located the line of the road from the present terminus at Merrillan, Wis., to within a few miles of Winona, Minn. It has for some time been uncertain whether Winona, Wabashaw or La Crosse would be the Western terminus of the road.

Winona & St. Peter.

The tracklayers have reached the Minnesota State line and are working on toward Lake Campeska in Dakota.

Hannibal & St. Joseph.

This company has instituted a suit against the collector of internal revenue for $50,000 paid as taxes on dividends and interest on the bonds of the company from January 1, 1870, to April, 1871. The company claims that this sum was collected unlawfully.

Bingham Canyon.

This Utah road has been sold to parties from Detroit, New York and Pittsburgh, who agree to finish the road forthwith.

Dunkirk, Warren & Allegheny Valley.

The track has at last been laid into the city of Titusville, Pa., up to the site of the depot in that place.

Cayuga Lake.

Regular freight trains commenced running through to Ithaca, New York, from Cayuga, July 7, and passenger trains will be put on in a few days.

Texas & Pacific.

A large number of workmen are employed in putting the machinery into the shops at Marshall, Tex. The tools are all from William Sellers & Co., in Philadelphia. The tracks in the repair shop yard are to be laid with the heavy French iron imported for the Memphis, El Paso & Pacific. Track-laying has been a little delayed by heavy rains and high water in the streams.

White Water Valley.

At a recent meeting of the bondholders of this company in Boston, a committee was appointed to examine into the affairs of the company and the management of the road. This committee, at an adjourned meeting held July 3, reported that the road is economically managed, and that is is for the interest of the bondholders that the present management should be continued. The committee reported strongly against taking any steps to have a receiver appointed. The recommendation was unanimously adopted.

European & Oregon Land Company.

The San Francisco *Bulletin* denies by authority the report that this company was to be dissolved and its land reconveyed to the Oregon & California Railroad Company. The land in question is the land grant of the Oregon & California road, which was made over to a separate company.

Railroad Valuation in Ohio.

The State Board of Equalization of Ohio recently completed the valuation of the railroad property in the State. The total valuation is $79,213,550, against $68,312,046 last year, an increase of $10,901,504.

Kansas Pacific.

Iron is being shipped from St. Louis for the Arkansas Valley Branch from Kit Carson, Col., to Fort Lyon. The branch will be 52 miles long, and it is proposed to extend it 60 miles further, up the Arkansas Valley to Pueblo.

Valley, of Virginia.

The Richmond (Va.) *Inquirer* says: "A very interesting suit is about to be commenced in Roanoke County to test the legality and validity of the subscription of that county of $200,000 to the capital stock of the Valley Railroad Company. A large number of the land owners and taxpayers of that county have determined to resist the subscription by all lawful means, and have retained counsel to commence proceedings, the object of which is to set aside the subscription on the part of the county, and to have the bonds of said county delivered to the company canceled."

The contractors for the work through Rockbridge, Botetourt and Roanoke counties, Messrs. Mason, Menefee and Harman, have begun work.

Inspection of Maine Railroads.

The Maine Railroad Commissioners have been making a tour of inspection over the Bangor & Piscataquis, European and North American (Maine Division) and Penobscot & St. Croix railroads. They report the first two in good repair, but the St. Croix road requires a large amount of labor to bring it up to the standard.

Stockton & Visalia

A new survey is to be made of this narrow-gauge road. The new line is to run near the Visalia Division of the Central Pacific and further from the foothills. The original line, running close to the hills, would require some pretty heavy work.

Central Pacific.

This company having refused to deliver government freight at San Francisco without prepayment of charges accruing on the railroad west of Omaha, the Attorney-General decides that the act is in violation of the law, and a suit will be brought against the company for the recovery of freight without the payment of such charges.

A new ferry boat about 400 feet long and having a capacity of 20 cars is to be built for the ferry from Oakland to San Francisco. The new boat will be much larger than any of those now in use.

Missouri, Kansas & Texas.

Texas papers report that this company is negotiating with the Texas & Pacific for the joint use of the track of the Trans-Continental Division from a point west of Sherman to Fort Worth.

Houston & Texas Central.

Surveys are now being made for the Eastern Branch, which is to leave the road at Rice, in Navarro County, and run thence northeast to Paris.

Pennsylvania—Amboy Division.

Extensive improvements are being made in and near Camden in the way of new side tracks and other terminal facilities. A new ferry boat for the Camden and Philadelphia ferry has been ordered from the Harlan & Hollingsworth Company at Wilmington, Del. It is to cost $70,000, and is to be built with special reference to forcing her way through the ice in winter.

New York & Osweg Midland—Montclair Division.

The Chancellor of New Jersey has granted an injunction forbidding the Sheriffs of Hudson, Essex and Passaic counties to seize or hold under attachment the rolling stock, on the ground that such seizure would jeopardize if not destroy the interest of the third-mortgage bond-holders, to whom the rolling stock is pledged. The company claims that the suits under which the rolling stock was attached were brought maliciously and in order to damage the credit of the company, and has commenced suit for damages.

Mississippi Valley & Western.

Local papers report that the iron required to complete this road is secured, and money provided to pay for laying it.

Northwestern Union.

Work on this road is progressing, and it is expected that the last rail will be laid about July 15. The road is about 63 miles long, and extends from Milwaukee northwest in a very direct line to Fond du Lac. It will be leased and operated by the Chicago & Northwestern Company.

Chicago & Superior.

The Rockford Central Railroad Company of Illinois and the Madison & Portage Company of Wisconsin have filed articles of consolidation with the Secretary of State of Illinois under the title of the Chicago & Superior Railroad Company. The road is to extend from Mendota, Ill., northward to a junction with the Wisconsin Central. The Madison & Portage road is in operation from Madison, Wis., north to Portage, 40 miles. The agreement for consolidation was made some time ago.

Marquette & Mackinaw.

The Board of Control of the Michigan State lands has received a proposal from the Marquette, Sault Ste. Marie & Mackinac Railroad Company and the Mackinac & Lake Superior Railroad Company, offering to build the projected road from Marquette to Mackinac for the grant of lands offered by the law passed at the recent session of the Legislature. Action upon the bids was deferred till the meeting to be held July 30.

Buffalo, New York & Philadelphia.

This company is now running trains through from Buffalo to Philadelphia, in connection with the Pennsylvania Railroad. The trains are run to Emporium over the Buffalo, New York & Philadelphia and thence over the Philadelphia & Erie and Pennsylvania roads. The trains go through without change of cars and the run is made in 14 hours. The distance from Buffalo to Philadelphia by this route is 411 miles. From Buffalo to New York by the Erie it is 422 miles, and by the New York Central & Hudson River, 440 miles.

Worcester & Shrewsbury.

Work was commenced on the Western Division of this line, the first narrow-gauge line begun in New England, from Worcester to Lake Quinsigamond in May last, and this division is to be ready for the cars this month.

Track-laying was to be begun last June. Hon. E. B. Stoddard, of Worcester, Mass., is the President of the company, Leach & Wellington contractors, Buttrick & Wheeler Chief-Engineers.

Philadelphia & Erie.

This company commenced running their through freight schedules over the new Linden line on the south side of the Susquehanna River on Monday, June 30. This line saves the crossing and recrossing of the river at Susquehanna and Williamsport (and would have saved the delay caused by the burning of the bridge at the former place just a year ago had it been finished at that time). It also saves the delay in running through Williamsport yard, the annoyance of blockading the street crossings in the city, and the strain, wear and tear of the two wooden bridges, which are each over 1,200 feet long.

The Eastern Division of this road during the months of April and May moved on an average over eleven hundred cars daily. For the week ending May 17, 7,149 cars were moved; for week ending May 24, 6,827 cars; Saturday, May 17, 1,520 cars were moved—1,051 loaded, and 469 empty—being the heaviest day's work done on the road (single track). By the new schedule a fast train with Pullman parlor cars is run from Philadelphia, Washington and Baltimore to Niagara Falls *via* the Buffalo, New York & Philadelphia Railroad. This train leaves Philadelphia at 7:30 a. m.; stops for dinner at Williamsport, and arrives at Buffalo at 9:45 p. m., and Niagara Falls at 11 p. m. This makes the shortest and quickest route from Philadelphia, &c., to Buffalo and Niagara.

Selma, Marion & Memphis.

It is stated that the work on this road from Memphis, Tenn., to Holly Springs, Miss., 46 miles, is to be pushed forward. A contract has been made for iron sufficient to lay the first section of 20 miles southeastward from Memphis, which is to be delivered at New Orleans in July. The estimated cost of this section of 20 miles is $189,000.

Dividends.

The usual semi-annual dividend of 3½ per cent. on the preferred stock of the Elmira & Williamsport Railroad Company will be paid in July.

The East Mahanoy Railroad Company will pay a dividend of 3 per cent. July 15.

The Oil Creek & Allegheny River Railroad Company will pay a dividend of 3 per cent. July 9.

The Atlantic & Pacific Railroad Company, lessees, will pay a dividend of 1½ per cent. on the stock of the Pacific Railroad Company of Missouri, July 15, to stockholders of record July 10.

The Philadelphia & Reading Company, lessees, will pay a dividend of $1.50 per share on the stock of the East Pennsylvania Railroad Company July 15.

The Montgomery & Erie Railway Company, which is operated by the Erie, has declared a semi-annual dividend of 3½ per cent.

Union Pacific.

The payment of the interest on the first-mortgage bonds was commenced July 3, the holders of the coupons being asked the following questions:

1. Do the coupons which you now present belong to either of the persons named in lists Nos. 1 and 2?

2. Are they the coupons of bonds which were distributed as dividends or allotments of profits to shareholders of this company directly, or by the seven trustees under the Oakes Ames contract, or the Davis contract, or through or by the Credit Mobilier of America; and if so, to whom do they belong?

The lists Nos. 1 and 2, referred to in the first question, contain the names of a large number of persons who are supposed to have obtained the bonds in the manner referred to in the second question.

St. Louis, Kansas City & Northern.

A suit has been commenced in the Circuit Court at St. Louis by S. G. Kitchen, of St. Louis, D. L. Leggett, D. Roberts and others, of New York, against the North Missouri Railroad Company and the St. Louis, Kansas City & Northern Railway Company, to set aside deeds of trust and conveyance, with the consequent sale of the road, made August 26, 1871, to Morris K. Jesup, of New York, on the ground that these deeds of trust, conveyance, etc., are void, because they were executed without legal authority given by the stockholders. The bill recites the circumstances under which the road passed into the hands of its present possessors; charges that the directors of the old North Missouri Company made use of their position and the trust reposed in them by means of a fictitious purchase of illegally issued bonds to become absolute owners of the road and its franchises, while disfranchising the stockholders of their rights. Another count in the bill prays the Court to order the present company and other defendants to account for abou

$5,000,000 of earnings and receipts which have come into their hands since the transfer of the road to the new company in 1871. The restoration of the road to its original owners is also asked for.

Central Asia.

M. de Lesseps, the well-known projector of the Suez Canal, is agitating a project for a railroad to connect the European system with the railroads of India. The line which he proposes would be about 800 miles long, and would extend from Orenberg, on the southeastern frontier of European Russia, which is the furthest point yet reached by the Russian lines, to the northwest frontier of British India, where it would connect with a line to be built from the Punjaub system of roads. A concession or charter has been asked for from the Russian Government, and the project is represented as being entirely practicable.

On the other hand, M. Vambéry, the celebrated traveler, who probably knows more of the topography of the region through which the line would pass than any other European, declares the plan is impracticable. On the steppes, or plains, over which the road must pass, the shifting sand is frequently drifted by the wind to a great depth over the smallest obstacle, while the snow-drifts in winter would present an equally formidable obstacle. There are, too, mountain chains to be crossed, which would require a very great expenditure of time and money. Added to the natural obstacles, the inevitable hostility of the nomadic tribes who occupy much of the country along the line would be a continual source of danger, delay and annoyance.

Macon & Brunswick.

Governor Smith, of Georgia, issued a proclamation, July 2, seizing the Macon & Brunswick Railroad, the company having failed to pay the interest on the bonds indorsed by the State. The seizure of the road was provided for by the act of the Legislature which granted the indorsement. George H. Hazlehurst has been appointed Agent of the State to receive and manage the property.

The road extends from Macon, Ga., southeast to Brunswick, 187½ miles, with a branch 10 miles long from Cochran to Hawkinsville. The bonds indorsed by the State amount we believe to $2,500,000, of which $1,900,000 were issued in 1867, and $600,000 in 1870.

Laclede & Fort Scott.

The affairs of this company appear to be in a complicated condition. A meeting was held and a board of directors chosen in St. Louis, June 16, but on the same day another meeting was held in Nevada, Mo., and another board chosen, which elected officers. The President and directors chosen at the Nevada meeting have let the contract for the construction of the road from Lebanon, Mo., to Fort Scott, Kan., to the Railroad Construction Company of St. Louis.

Atchison, Topeka & Santa Fe.

The extension from Sargeant, Kan., west to Grenada, Col., 12 miles, was completed July 1.

Shipments of Texas cattle have begun. It is stated that 60,000 head are at Wichita ready for shipment, and 150,000 head on the way from Texas to that point.

The company is now making sales of land on eleven years' time, requiring no payment but interest for the first four years.

New Postal Routes.

Postal service has been ordered on the Mansfield, Coldwater & Lake Michigan Railroad, between Mansfield and Toledo, O., a distance of 83 miles. Compensation not fixed.

Postal service has also been ordered on the Ashtabula, Youngstown & Pittsburg Railroad, between Ashtabula and Youngstown, O., 62 miles. The compensation will be fixed hereafter.

Pennsylvania & Delaware.

Regular trains commenced running over this road from Pomeroy, Pa. (on the Pennsylvania road, 42 miles from Philadelphia), southeast to Delaware City, Del., June 30.

The names of the stations on the line are Pomeroy, Stottsville, Newlin, Gum Tree, Rokeby, Doe Run, Pusey, Chatham, Avondale, Landenberg, Thompson, Newark, Philadelphia, Wilmington & Baltimore Railroad Crossing, Goodes, Glasgow, Delaware Railroad Crossing, Corbit, Reybold, Delaware City. At Landenberg connection is made with the Wilmington & Western road.

Vermont Valley.

A meeting of the stockholders of this company which had been called at Bellows Falls, Vt., June 27, was adjourned to July 21, in consequence of a temporary injunction granted the directors by the Chancellor of Vermont. About three-fifths of the stock of the road was represented at the gathering.

Toledo & Michigan State Line.

This company, which filed its articles of incorporation with the Secretary of State of Ohio, July 2, intends to build a railroad from Toledo, O., to a point on the State line in Chesterfield township, Fulton County, a distance of about 30 miles. The capital stock is to be $200,000, and the corporators are Charles A. King, T. M. Cook, R. K. Bakegbob, M. D. Richardson and James P. Hawley.

Erie.

It is reported that surveys are to be made for a new line for the western end of the Delaware Division. The line is to run from Hancock, 29 miles east of Susquehanna, northward to Hale's Eddy, and thence west to Susquehanna, crossing the Jefferson Branch at Starucca. It is said that a line can be obtained which will avoid the heavy grades between Deposit and Susquehanna.

Walkill Valley.

This road is being improved and put in good condition. A new connection with the Erie at Goshen, N. Y., is being built. Arrangements are being made to run trains through from Kingston to New York without change.

National.

The date to which the promised payments for the right of way had been postponed has passed, and no payments have been made.

A mortgage on the road for $3,500,000 has been filed in the County Clerk's office at Trenton, N. J.

Galveston, Houston & Henderson.

The Galveston (Tex.) *News* of July 1 says:

"It is certain that a combination has been proposed between the International & Great Northern, the Houston & Texas Central and the Galveston, Harrisburg & San Antonio roads, with a view to the absorption of the Galveston, Houston & Henderson, and the making of this city the terminal point of the combined roads.

"We understand that Mr. Pierce, on behalf of the Galveston, Houston & Henderson Company, proffered to sell the franchises of that road to the combined companies for 50 per cent. of its face value, but that prominent stockholders objected to the arrangement on the score that Mr. Pierce, being a large shareholder in the San Antonio road, would be benefited by such a bargain disproportioned to the other stockholders.

* * * * * *

"The arrangements to which we have referred, it appears, were neither perfected nor defeated, but sixty days were given within which definite answers were to be returned to the proposals from the combination mentioned above.

"Rumor further asserts that, according to Mr. Pierce's ideas, the city of Galveston can afford to donate to the combined roads, on condition that they put down two rails inside of the present ones on the Galveston, Houston & Henderson road, and transfer their offices, etc., to this city, $500,000 cash, 2,500 feet of wharf front, and ten acres of ground for depot purposes. Of course, Mr. Pierce could only speak of what he thought the city could afford to do, and would not presume to make a promise to that effect.

"On the other hand, it is said that the International and Central corporations are desirous to have proposals come from the city, as to the inducements she is willing to offer in consideration of laying new rails on the old road bed from here to Houston, so as to enable the International trains to come here, the transfer of offices, etc., to this city—in short to make this the terminus of the consolidated roads."

The Galveston, Houston & Henderson road runs from Houston to Galveston, 51 miles. It is of 5 feet 6 inches gauge, while the International & Great Northern is of 4 feet 8½ inches, as is that part of the Houston & Texas Central north of Corsicana. That part of the Central south of Corsicana is, we believe, shortly to be changed to 4 feet 8½ inches from its present gauge of 5 feet 6 inches.

Vineland.

This road was recently sold under foreclosure of mortgage, at Vineland, N. J. It was purchased by representatives of Jay Gould for $10,000 over the amount of the mortgage and accrued interest. The road extends from Atsion, N. J., southwest 47½ miles to Bayside, and has been leased and operated by the New Jersey Southern, with which road it will now doubtless be consolidated.

Railroad Taxation in New Jersey.

The State Commissioner of Railroad Taxation has made his report to the Comptroller. The report is not complete, many of the townships not having made their returns in time. The Commissioner is required by law to report on the 1st day of July in each year. The law exempts the main road-bed, not exceeding 100 feet in width, and also ten acres of land with the buildings thereon at each terminus. The town assessors send their valuations to the State Commissioner, who, after hearing the statement of the companies, fixes the valuation. This taxation is in addition to the State tax paid by the companies.

The amounts reported by the Commissioner are as follows for the different counties:

Hudson, of which $11,000,000 is from Jersey City	$12,030,200	Ocean	$500
Essex	814,050	Atlantic	3,400
Bergen	22,100	Mercer	311,070
Morris	127,200	Burlington	179,150
Sussex	4,900	Camden	350
Warren	157,235	Gloucester	2,500
Somerset	1,200	Cumberland	400
Union	40,000	Salem	1,000
Monmouth	1,225	Cape May	2,800
Middlesex	32,350	Total	$13,731,330

No returns from any town in Passaic or Hunterdon were received. The returns include most of the large towns.

New Issue of Bonds in the Market.

The Chicago & Canada Southern offers through Leonard, Sheldon & Foster and Winslow, Lanier & Co., of New York, $5,000,000 of 7 per cent. gold bonds, coupon and registered.

The New Jersey Midland asks bids until noon of July 8 for $600,000 consolidated mortgage 7 per cent. gold bonds, having 50 years to run.

The Toledo, Wabash & Western offers, through Winslow, Lanier & Co. and Perkins, Livingston & Post, of New York, $1,000,000 of a new issue of $5,000,000 of 7 per cent. gold bonds having 20 years to run.

The Jacksonville, Northwestern & Southeastern Railway Company, of Illinois, offers through Gibson, Casanova & Co., New York, $2,500,000 of first mortgage 7 per cent. gold bonds at 90, the issue being at the rate of $20,000 per mile.

The Burlington, Cedar Rapids & Minnesota offers the balance of an issue of first mortgage 7 per cent. gold bonds at the rate of $20,000 a mile on the Milwaukee Division.

The Central Railroad and Banking Company, the Macon & Western Railroad Company and the Southwestern Railroad Company of Georgia (all of which have long paid dividends of from 8 to 10 per cent. yearly) ask proposals for $2,000,000 of joint first mortgage 7 per cent. bonds, having 20 years to run, being part of an authorized issue of $5,000,000, which would be at the rate of about $7,000 per mile. Proposals will be received at the National City Bank of New York until July 16.

The St. Louis & Southeastern offers the balance of an issue at the rate of $20,000 per mile, of first mortgage, seven per cent. gold bonds, running till 1902, at 90 and interest, through George Opdyke & Co. and Winslow & Wilson, New York.

The Chesapeake & Ohio offers, through Fisk & Hatch, New York, at 90, an issue of 7 per cent. gold bonds secured by a first mortgage on an extension to be made from Richmond to Chesapeake Bay; also at 88½, the 6 per cent. gold bonds secured by first mortgage on the completed road.

The Indianapolis, Bloomington & Western offers, through Turner Bros., New York, an issue of 7 per cent. gold bonds, secured by a mortgage on the new Western Extension, at 90.

The Lake Shore & Michigan Southern offers, through Robinson, Chase & Co., New York, an issue of $6,000,000 7 per cent. sinking fund bonds, one-tenth to be retired annually, at 94.

The Milwaukee & Northern offers, through Vermilye & Co. and Greenleaf, Morris & Co., New York, an issue of first mortgage 8 per cent. bonds at 90.

The Lamoille Valley, the Essex County and the St. Johnsbury railroad companies, forming the Vermont Division of the Portland & Ogdensburg Railroad Company, offer through E. & T. Fairbanks & Co., of St. Johnsbury, Vt., Fairbanks & Co., of New York, and Fairbanks, Brown & Co., of Boston, an issue of first-mortgage sinking-fund gold bonds at the rate of $20,000 per mile at 90.

The Northern Pacific offers the balance of its issue of 7.3 per cent. first-mortgage gold bonds, issued at the rate of $50,000 per mile, at par, through Jay Cooke & Co.

The Logansport, Crawfordsville & Southwestern offers through Jones & Schuyler, New York, first mortgage 8 per cent. gold bonds, issued at the rate of $16,000 per mile.

The South Side Railroad Company of Long Island offers, through Jacob R. Shepherd & Co., New York, its 7 per cent. first-mortgage bonds, due in 1892.

The Central Extension Railroad Company of Long Island offers $200,000 for first-mortgage 7 per cent. bonds running till 1903, at 90 and interest, through Knoblauch & Lichtenstein, New York.

The Sioux City & St. Paul Railroad Company offers, through Augustus J. Brown & Co., New York, its first-mortgage 8 per cent. bonds, issued at the rate of $14,000 per mile, at 92½.

New York & Long Branch.

Chancellor Runyon, of New Jersey, has refused to grant an injunction against the building of the bridge over the Raritan at Perth Amboy.

Ware River.

Track-laying on the extension from Gilbertville to Winchendon, Mass., has been commenced.

Cairo & St. Louis.

The track on this narrow-gauge road is now laid to Murphysboro, Ill., 75 miles from East St. Louis and 18 miles beyond the last point reported. Trains will soon begin running to Murphysboro.

Memphis & St. Louis.

At a recent meeting of the board of directors, the President was authorized to open negotiations with Mr. Allen, President of the St. Louis & Iron Mountain Company, and to endeavor to make some agreement by which the Memphis & St. Louis road can be built from Memphis to some point on the Cairo & Fulton road.

Gilman, Clinton & Springfield.

A dispatch from Springfield, Ill., states that this road was to be transferred to the Pennsylvania Company, July 1. It is reported that the road will be extended from Springfield south to Litchfield, on the St. Louis, Alton & Terre Haute road. This extension would be about 42 miles long.

LOCOMOTIVE RETURNS, MARCH, 1873.

Master Mechanics of all American railroads are invited to send us their monthly reports for this table.

Name of Road.	Number of miles operated	Number of Locomotives in service	Mileage. Passenger	Freight	Miscellaneous	Total	No. of Miles run to Ton of Coal	Cord of Wood	Pint of Oil	Cost per Mile, in Cents, for Repairs	Fuel	Stores	Miscellaneous	Engineers, firemen and wipers	Total	Average Cost of Coal, per ton	Wood, per cord	Oil, per gallon
																$	$	$
California Pacific	143	9	14,813	4,932	3,275	23,020	.....	45.11	18.44	7.07	10.84	0.80	....	6.02	24.73	.....	5.00	....
Central Pacific (Western Division)	173.4	44	40,897	40,338	29,745	110,980	49.42	.....	13.97	10.99	17.01	0.93	....	6.62	35.55	8.46	4.33	....
" " (Sacramento Div.)	119.5	36	13,812	38,562	30,709	83,083	.....	29.56	16.66	12.37	14.75	0.80	....	7.67	35.59	.....	4.33	....
" " (Truckee Div.)	204.5	27	12,860	43,077	11,975	67,912	53.83	53.03	12.60	12.53	22.16	1.03	....	8.01	43.78	8.46	4.36	....
" " (Humboldt Div.)	230.6	20	15,524	39,223	6,200	60,947	34.97	.....	11.78	16.45	24.05	1.08	....	7.05	48.63	8.46	4.36	....
" " (Salt Lake Div.)	132.8	24	11,404	57,345	6,200	74,949	34.97	.....	10.86	10.95	24.05	1.11	....	7.14	43.15	8.46	4.36	....
" " (Oregon Div.)	151.48	9	11,260	7,568	2,900	21,728	.....	42.27	22.52	10.70	10.32	0.59	....	6.47	28.08	.....	4.36	....
" " (Visalia Div.)	146.3	8	8,840	6,240	2,900	17,980	58.81	.....	21.82	5.60	14.27	0.63	....	7.04	27.54	8.46	4.36	....
Chicago & N. W. (Wis. & Mil. Div.)	.....	65	68,392	90,156	58,646	217,194	23.21	.....	.....	0.62	15.82	1.13	....	5.40	25.17	3.50	4.75	....
" " (Madison Div.)	.....	19	13,390	24,598	13,438	51,426	40.85	.....	.....	2.13	10.20	0.76	....	7.63	20.72	3.50	4.75	....
" " (Galena Div.)	.....	71	43,267	84,400	44,841	172,508	31.52	.....	.....	18.26	11.58	4.90	....	8.97	43.71	3.50	4.75	....
" " (Iowa Div.)	.....	75	44,168	82,404	45,150	171,722	28.53	.....	.....	3.10	12.56	0.81	....	9.22	30.69	3.50	4.75	....
" " (Peninsular Div.)	.....	21	9,750	12,607	31,778	54,135	43.56	.....	.....	5.85	9.79	0.55	....	6.91	23.10	3.50	4.75	....
Chicago, Rk. Isl. & Pacific (Ill. Div.)	.....	83	42,456	142,657	4,695	189,812	37.56	.....	15.07	5.78	8.71	0.57	....	7.27	22.31	3.25	3.50	....
" " " (Iowa Div.)	.....	107	63,571	163,934	25,804	253,369	36.52	.....	12.91	4.87	8.94	0.63	....	7.23	21.67	3.25	3.50	....
Cleve., Col., Cin. & Ind. (Ind. Div.)	207	56	25,840	134,898	29,290	190,018	39.12	.....	21.34	4.61	6.43	0.59	....	7.46	19.09	2.70	....	....
" " " (Col. Div.)	138	54	25,010	64,012	47,838	136,860	40.62	.....	21.51	2.36	6.65	0.65	....	7.60	17.26	2.70	....	....
" " " (Cin. Div.)	139	26	20 643	26,600	20,413	67,656	45.80	.....	19.27	3.34	5.90	0.52	....	8.41	18.36	2.70	....	....
Cleveland & Pittsburgh	.....	83	.....	.....	.....	210,993	55.53	.....	18.92	3.14	5.55	0.63	....	7.17	16.53	2.60	1.95	....
Denver Pacific	121	6	8,583	5,408	3,000	14,996	42.71	.....	14.04	1.17	8.45	0.58	....	7.30	17.50	3.75	2.58	....
Hannibal & St. Joseph	.....	65	33,785	78,903	30,513	143,201	43.26	.....	18.20	9.20	6.90	0.80	....	7.40	24.30	2.75	5.00	....
Illinois Central (Chicago Division)	252.5	71	44,579	93,369	37,224	175,172	32.43	.....	10.89	10.03	6.27	0.77	....	6.92	23.89	1.90	3.70	....
" " (South Division)	210.75	34	26.621	60.775	15,969	103,365	29.60	.....	10.43	7.09	6.77	0.81	....	6.66	21.33	1.90	3.70	0.50
" " (North Division)	225	45	28,913	23,256	14,684	126,853	28.25	.....	11.56	9.11	6.99	0.73	....	6.74	23.57	1.90	3.70	0 53
" " (Iowa Division)	140	37	23,355	68 874	13,846	111,075	31.88	.....	13.18	4.98	7.46	0.47	....	6.03	19.96	2.25	7.50	0.50
Kansas Pacific	672	.....	59,743	86,016	38,488	184,247	37.03	.....	12.77	6.27	10.33	0.62	....	7.19	21.41	3.75	3.12	....
Lake Sh. & Mich. Sou. (Buffalo Div.)*	.....	83	24,902	149,320	73,914	248,136	48.20	.....	12.14	4.31	7.24	.....	....	5.95	18.10	3.50	3.50	....
" " " " (Erie Div.)*	.....	93	41,590	171 046	56,813	269,449	44.99	34.23	16.57	4.93	7.96	.....	....	7.24	20.13	3.50	4.00	....
" " " " (Toledo Div.)*	.....	74	42,491	149,144	23,745	225,380	45.65	51.46	14.18	4.60	8.47	.....	....	7.07	20.14	4.00	4.00	....
" " " " (Mil.So. Div.)*	.....	178	127,904	258,422	185,547	571 873	32.80	43.64	17.47	4.09	9.60	.....	....	6.68	29.97	4.50	3.50	....
Leavenworth, Lawrence & Galveston	.....	15	17,369	18,000	3 242	38,611	67.72	.....	28.25	2.35	6.17	0 50	....	6.75	15.78	4.00	2.25	....
Marquette, Houghton & Ontonagon†	.....	13	5,296	5,677	12 130	23,153	78.71	.....	20.67	24.12	10.73	1.03	....	10.29	46.17	.....	.....	....
																p. bu		
Pennsylvania (New York Division)	119.2	113	151 127	125,089	11,984	290,200	34.56	51.8	8.21	8.10	14.30	1.60	....	.....	24.00	0.17	6.48	....
" " (Amboy Division)	154 2	64	51,184	64,896	3,262	119,372	43.3	48.03	12.23	5.20	10.80	1.10	....	.....	17.10	0.17	6.48	....
" " (Belvidere Division)	84.6	36	20,292	52 981	8 152	61,423	36.31	42.49	11 29	4.00	14.50	1.40	....	.....	19.90	0 17	6.48	....
" " (Philadelphia Div.)	131.6	137	73,356	286 413	11,007	370,833	31.94	.....	16.19	5.30	7.20	0.80	....	.....	13.30	0.07	3.52	....
" " (Middle Division)	58.75	125	32,735	277 659	13,993	360,647	28.32	.....	17.69	5.50	7.90	0.70	....	.....	14.10	0.07	3.52	....
" " (Pittsb'g Div., E. End.)	.....	75	9,589	149,474	2,740	161,793	25.07	.....	10.69	2.10	8.90	1.10	....	.....	17.10	0.07	3.52	....
" " (Pittsb'g Div., W. End.)	.....	114	67,812	193,382	8 030	272,705	32.75	.....	14.03	3.40	6.50	0.90	....	.....	15.30	0.07	3.52	....
" " (Tyrone Division)	100.3	27	11.099	31,448	2.786	45,324	28.1	.....	27.03	8.50	7.30	0.70	....	.....	16.50	0.07	3.52	....
" " (West Penn'a Div.)	103.6	29	16,510	46,961	3,026	66 497	33.22	.....	23.04	4.2	6.20	0.60	....	.....	11.0	0.0	3.52	....
" " (Lewistown Division)	62.5	13	7.145	14,696	1.174	23,015	42.6	.....	12.99	0.60	5.00	0.90	....	.....	16.5	0.07	3.53	....
" " (Bedford Division)	45	7	4,400	6,850	1,936	13,231	53.15	.....	20.33	2.20	4.10	0.80	....	.....	7.10	0.07	3.54	....
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Pittsb., Ft. Wayne & Chic. (E. Div.)	319.2	153	80,153	339,738	9,900	429,791	40.56	.....	13.81	5.62	6.78	0.39	1.16	7.12	21.57	.....	.....	....
" " " (W. Div.)	280	103	80,110	223,795	18,935	325,870	38.40	21.30	17.10	7.20	11.60	0.60	....	7.00	26.40	3.20	3.25	....
Pitts., Cin. & St. L. (Lit. Miami Div.)	.....	40	43,814	44,679	3,673	96,751	43.50	.....	12.15	5.30	8.10	0.80	2.30	6.00	25.00	2.62	3.45	....
South Carolina	343	37	18,266	55,127	11,982	93,375	.....	36.67	31.25	5.64	7.21	0.61	....	.....	13.46	.....	3.60	....
Flint & Pere Marquette	.....	.....	21,052	37,054	19,408	80,510	.....	46.90	29.00	4.65	9.59	1.00	....	6.72	21.96	.....	4.50	....
Maine Central	.....	.....	47,509	33,388	14 966	95,863	.....	.....	14.82	7.02	.....	0.72	....	7.79	15.53	.....	.....	....
Chicago, Burlington & Quincy	.....	285	.....	.....	.....	611,772	37.20	.....	13.61	7.34	8.51	0.66	....	9.20	25.71	3.00	4.25	....

* Switching Engines allowed six miles per hour.

† 0.92 lbs. sand used per mile run.